



# **GLOBAL CHANGE AND CORAL REEF MANAGEMENT CAPACITY IN THE PACIFIC: ENGAGING SCIENTISTS AND POLICY MAKERS IN FIJI, SAMOA, TONGA AND TUVALU**

## **Final Report**



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**School of Marine Studies  
Institute of Marine Resources**

**Global Change and Coral Reef Management Capacity in the Pacific:  
Engaging Scientists and Policy Makers in Fiji, Samoa, Tuvalu and Tonga**

Institute of Marine Resources  
School of Marine Studies  
Faculty of Science, Technology and Environment  
University of the South Pacific

In collaboration with

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Faculty of Science, Technology and Environment  
University of the South Pacific

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## ACRONYMS

CBD	Convention on Biological Diversity
CC	Climate Change
CHM	Clearing House Mechanism
CI	Conservation International
DOF	Department of Fisheries
EEZ	Exclusive Economic Zone
FAD	Fish Aggravating Device
FLMMA	Fiji Locally Managed Marine Area
GCRMN	Global Coral Reef Monitoring Network
GEF	Global Environment Fund
IAS	Institute of Applied Science
ICM	Integrated Coastal Management
IUCN	International Union for Nature Conservation
KBA	Key Biodiversity Areas
NAPA	National Adaptation Plan and Assessment
NGO	Non-Government Organization
NRI	National Resource Inventory
NUS	National University of Samoa
MAF	Ministry of Agriculture and Fisheries
MDG	Millennium Development Goal
MECC	Ministry of Environment and Climate Change
MNRE	Ministry of Natural Resource s and Environment
MMA	Marine Managed Areas
MOT	Ministry of Tourism
MPA	Marine Protected Areas
NAPA	National Adaptation Programme of Action
NBSAP	National Biodiversity Strategy and Action Plan
NCCP	National Climate Change Policy
PAC	Protected Area Committee
PACE-SD	Pacific Center for Environment and Sustainable Development
SMA	Special Managed Areas
SOPAC	South Pacific Applied Geoscience Commission
SPREP	Secretariat of the Pacific Regional Environment Programme
POWPA	Program of Work for Protected Areas
USP	University of the South Pacific
UNFCCC	United Nations Framework Convention on Climate Change
UN	United Nations
V&A	Vulnerability and Adaptation

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY.....</b>	<b>1</b>
<b>INTRODUCTION.....</b>	<b>3</b>
<b>METHODOLOGY.....</b>	<b>5</b>
<b>RESULTS &amp; DISCUSSION.....</b>	<b>6</b>
Table 1: Fiji Summary Findings.....	6
Table 2: Samoa Summary Findings.....	10
Table 3: Tonga Summary Findings.....	12
Table 4: Tuvalu Summary Findings.....	15
<b>CONCLUSION.....</b>	<b>17</b>
<b>FUTURE DIRECTIONS.....</b>	<b>18</b>
<b>REFERENCES.....</b>	<b>19</b>
<b>WEBSITES.....</b>	<b>19</b>
<b>APPENDIX 1.....</b>	<b>20</b>
Fiji Workshop Programme (June – August 2010).....	20
Participant list.....	21
Samoa Workshop Programme (June – August 2010).....	23
Participant list.....	24
Tonga Workshop Programme (June – August 2010).....	26
Participant list.....	27
Tuvalu Workshop Programme (June – August 2010).....	28
Participant list.....	29
<b>APPENDIX 2.....</b>	<b>30</b>
Fiji Progress Report (April 2011).....	30
Samoa Progress Report (April 2011).....	40
Tonga Progress Report (April 2011).....	46
Tuvalu Progress Report (April 2011).....	52



## EXECUTIVE SUMMARY

Sustaining healthy coral reefs is vital to the livelihoods of the people of the Pacific Islands. Global change is having increasing impacts on Pacific coral reefs, leading to increased vulnerability of coastal communities (*Reefs at Risk Revisited*, 2011. World Resources Institute). Integrating global change into policies across various national government sectors and then, translating this into actions that lead to sustainable management of coastal ecosystems is an enormous challenge. The project sought to address this through face-to-face dialogue between reef experts and government personnel responsible for coral reef management policies. It aimed to strengthen science-policy interaction and linkages and empower policy-makers to make informed decisions. The project targeted four countries all heavily dependent on their coral reefs: Fiji, Samoa, Tonga and Tuvalu.

Using the most recent information available on the sustainable management of coral reefs, the project brought Pacific Leaders together with scientists and experts so that they could be apprised of the impacts of global change and of those factors that are affecting the health of their coral reefs. For each country a detailed national dossier was prepared by the project team in consultation with the countries, leading into two-day workshops. The dossier included a series of issues (including gaps) pertinent to each country which were used in the development of national coral reef plans. About a year later, countries were re-visited to review and measure the progress achieved on recommendations on fisheries, marine managed areas, global change and multi sectoral, multi stakeholder consultations.

Workshops were held between June and August 2010, in which a total of some 130 senior officials from Fiji, Samoa, Tuvalu and Tonga attended. The workshops identified priority actions for coral reef management. It was found that all four countries had in place, or are developing, appropriate policies for the sustainable management of their coral reefs, taking into account the anticipated impacts of global change. All lacked, however, an overarching policy and the necessary human resources and expertise required for implementation. This situation highlights the dilemma faced by the small Pacific countries responsible for the custodianship of the unique biodiversity of their reefs. In follow-up discussions two countries (Samoa and Tuvalu), requested our assistance in the development of their National Ocean Policies, which would provide the necessary over arching policy and national commitment to sustainable coral reef management. The Institute of Marine Resources has the necessary expertise to do this, but would require the necessary funding.

About eight months later, the team visited each country and had consultations with key stakeholders on the progress from the recommendations made during the June-August 2010 workshops. In addition, information was gathered through a literature review. Although progress varied in the four countries, it was evident that collaboration between relevant government departments needed to be improved and that there was a need for the establishment and implementation of management systems that will be on-going and self financing given the resources available.

The project provided a model for interaction between scientists and policy makers that could be readily extended to other Pacific Island countries or, for that matter, to other island states where the sustainable management of coral reefs is of vital importance for the

conservation of valuable reef resources, and for maintaining the livelihoods of people. Limitations of the project were determined by the smallness of the countries and the consequent lack of human resources to implement policies.



## INTRODUCTION

Four workshops on Climate Change Adaptation were held for 130 senior officials from Fiji, Samoa, Tonga and Tuvalu between June to August 2010. These workshops featured briefings on likely impacts of climate change and sought suggestions for policy changes for adaptation. Climate change has generally not yet been built into national policies as a cross-cutting theme and there is a need to improve communication among those responsible for coral reef management. Many challenges lie ahead for Pacific Island countries, the most important of which include a significant change in mind-set, *modus operandi* and capacity building.

A general overview of coral reef issues in the Pacific was prepared by the Institute of Marine Resources, followed by dossiers on each country, including a gap analysis regarding global change and coral reef governance issues. Input from the countries was sought before the dossiers were distributed to participants. Workshops were held between June to August 2010, at which a total of some 130 senior officials from the four countries attended. The workshop format comprised presentations on the current status of coral reef and climate change issues and policies given by the project team leaders, government officials, NGOs and civil society representatives. Following open discussions break-out groups reviewed the gap analysis and recommendations, with provision being made of modifications, additions and comments. The resulting conclusions were then discussed in Plenary, when a national coral reef action plan was formulated. Follow up on progress with the action plans will take place during the coming year.

The workshops presented a welcome opportunity to engage with the senior government and civil society representatives from the four countries. Time was also available to organize meetings with some stakeholders and to discuss areas of common interests such as how the University of the South Pacific (USP) could assist the countries with their self determined plan.

Although there are great differences among the four target countries in terms of size, environment, culture and population, the workshops identified a number of common and recurrent themes. All of the countries are signatory to the relevant United Nations Conventions and Agreements relevant to global change and the environment, although for some reporting presents challenges. All countries have in place, and are currently reviewing or updating, the necessary policies regarding the conservation and sustainable use of their coral reefs and marine resources, and all recognize the important role of climate change in the long-term sustainability of their marine resources and food security, but climate change issues have not yet been incorporated as a cross-cutting theme among the relevant government departments. In Tonga, for example, the Ministry of Environment and Climate Change seeks to put things in perspective under one umbrella, but it was evident that there are difficulties between them and the Department of Fisheries regarding allocation of funding and responsibilities. In general the governments recognize the need for integrated planning, but there is a need to improve communications among those line departments responsible for the management of coral reefs: for some this will require a significant change in mind-set and *modus operandi*. There was a universal lack of knowledge of the 2002 Regional Oceans Policy, developed and approved by the Forum Leaders and presented at the World Summit on Sustainable Development held in Johannesburg. In discussions, two

countries (Tonga and Tuvalu) resolved to examine the possibility of using the Regional Oceans Policy as a template for the development of National Oceans Policies.

The need to raise public awareness about global change and coral reef issues was recognized by all, as was the need to find ways to incorporate marine issues in the school curriculum. Much of the curriculum is currently based on developed country principles. This would require the necessary teacher education. A significant amount of work needs to be done in this area.

There are common threats to coral reefs throughout the region, including unsustainable fishing causing stock depletion, pollution from land-based sources, habitat destruction and global change, including sea level rise, sea temperature rise, ocean acidification and increased strengths of cyclones. Exacerbating all of these is rapid population growth. All of these threats are evident to greater or lesser extents in the target countries.

All four countries recognize over-fishing and depletion of reef fish stocks as a major problem and this, coupled with high population growth indicates that there will be serious shortages of fish within the next twenty years, unless some strong conservation measures are put in place. The difficulty in enforcement of fishery regulations is a serious problem throughout, largely because of a lack of capacity. Alternative livelihoods will need to be developed for disenfranchised fishers. The expansion of aquaculture is seen as a possible replacement source for reduced protein supplies; however, the scope for this is limited in Samoa and Tuvalu but has good potential in Fiji and Tonga.

The establishment and management of Marine Protected Areas (MPAs) or similarly designated areas is of high priority in all the countries, as well as the recognition of the important role they play in conservation; but only in Fiji and Samoa has this reached a high level of community engagement through the Fiji Locally Managed Marine Areas programme (FLMMA), and the Village Fish Reserves, accompanied by Village By-Laws in Samoa. Community engagement was seen as crucial to the long-term effectiveness of protected areas. Tonga has a variety of reserves and parks, with policies and community engagement still evolving, whereas in Tuvalu there is only one significant MPA (involving significant community participation), with others in the outer islands under consideration.

All countries have reef monitoring programmes to various degrees of frequency and location; the importance of monitoring from the point of view of provision of management advice was recognized, as well as the need to engage more with communities. The lack of monitoring capacity is an issue. Significantly, it is evident that monitoring and recording of biodiversity is in its infancy, with the exception of Fiji. National Biodiversity inventories are thus seriously inadequate and much of the marine biodiversity, with the exception of commercially important species, is unrecorded. The need for incorporation of global change aspects and socio-economic monitoring was also recognized.

A significant number of global change and related projects are underway in all four countries, and with the support of a variety of donors. The participants noted that there is a need for better coordination of projects and donor support to avoid duplication of effort.

The University of the South Pacific certainly was recognized for its effort to engage the countries in the important area of coral reef management and development. The challenges

faced by the countries are huge and provide opportunities for joint projects with USP. A significant number of initiatives arose during the workshops, including the following:

- The potential for marine biodiversity surveys in Tonga, Samoa and Tuvalu;
- Introduction of Seagrass Watch programmes in Samoa and Tonga;
- The need for coral identification training in Tonga, Samoa and Tuvalu;
- Development of a regional Climate Change Clearing house, preferably at USP;
- The need for assistance with capacity building in all countries (USP can play a pivotal role);
- Facilitation of attachments of USP students with their relevant home Governments;
- Assistance with the new Marine Science programme at the National University of Samoa (NUS)
- Closer collaboration with Secretariat of the Pacific Regional Environment Programme (SPREP) in the area of coral reefs and coral reef management;
- Re-activation of the *Two Samoa's* initiative (between American Samoa and Samoa);
- A commitment by two countries (Tonga and Tuvalu) to work towards development of National Ocean Policies, based on the Regional Oceans Policy template approved by the Forum Leaders in 2002. Need to consult within the country, as well as with Traditional Leaders
- Need for improved collaboration between all stakeholders – interaction with Government will lead to securing more political will, e.g. population growth
- Need to harmonize among projects, to have better coordination among agencies
- Need to address the disconnection between community (bottom up) and government (top down) resource management systems
- Need good governance at community level
- Need continuous monitoring or else we will not have statistics on fisheries (subsistence, per capita consumption)

## METHODOLOGY

Workshops were held between June and August 2010, in which a total of some 130 senior officials from the four countries attended. Prior to the workshop, detailed country dossiers were prepared by the project team in consultation with the countries. The workshop format comprised presentations on the current status of coral reef and climate change issues and policies and some existing initiatives given by the project team leaders, government officials, NGOs and civil society representatives. Following open discussions, break-out groups reviewed and analyzed the needs and gaps (as per country dossier) and recommended modifications, additions and comments. The resulting conclusions were then discussed in Plenary where, a National Coral Reef Action Plan was formulated using the suggestions from the breakout groups (See Appendix for details).

During April to May 2011, a combination of consultations with key stakeholders and a literature review was carried out by Joeli Veitayaki (School of Marine Studies), Robin South (Institute of Marine Resources) and Cherie Morris (Institute of Marine Resources) in Fiji, Tonga, Samoa and Tuvalu to assess how much progress had been made on the actions

recommended during the country workshops which took place from June-August 2010. The key stakeholders included staff from the Department of Fisheries, Department of Environment/ Ministry of Natural Resources and Environment, Department of Tourism, Fishing Industry, conservation non-government organizations, and civil society (See Appendix).

## RESULTS & DISCUSSION

Progress on the workshop recommendations varied in all four countries in terms of management and conservation of fisheries resources, global changes and multi-sectoral, multi stakeholders consultations. Summaries of findings in each target country are presented in Tables 1-4 (See Appendix for details).

*Table 1. Fiji: Summary of findings*

Themes	Findings
Fisheries	<p>National data on subsistence (and artisanal) fisheries is fragmented.</p> <p>The enforcement process has been improved upon in the new legislation, the Inshore Fisheries Decree which is due to be enacted in 2011 after wide consultations.</p>
Marine Managed Areas	<p>The Fiji National Protected Area Committee which was established in 2008 under the Environment Management Act 2005 is addressing the legal basis of MMA's, the identification of biodiversity hotspots and the identification of a marine World Heritage site.</p> <p>Active management has been recommended for areas with the least intact connectivity in highly agricultural centres of Nadi, Ba and Labasa.</p> <p>An opportunity has been identified to work with the Fisheries Department to declare offshore protected areas beginning with the Lau province.</p> <p>Community leadership can be strengthened through the "Inshore Fisheries" thematic area in the Implementation Framework 2010-2014 for the NBSAP 2007 which addresses strengthening natural resources leadership and governance in communities.</p> <p>A framework for an Integrated Coastal Management Plan which includes a Mangrove Management Plan is currently being developed by the Department of Environment in collaboration with partners.</p>
Global Change	<p>Fiji has begun consultations on its National Climate Change Adaptation Strategy for the Climate Change Policy being developed by the Department of Environment.</p>

	The University of the South Pacific in collaboration (with the Department of Environment) is playing a major role in community awareness on potential impacts of climate change in coastal areas through projects, the development of awareness materials and post-graduate courses.
Multi-sectored, multi-stakeholder consultations	<p>Initiatives taken by the Department of Environment (DOE) that will allow for wider consultation among relevant departments and stakeholders with respect to coastal development include: the establishment of a national clearing house mechanism for biodiversity data in order to facilitate scientific and technical cooperation, knowledge sharing and information exchange between stakeholders/partners; the development of a Natural Resource Inventory (NRI) which provides baseline information on all resources available including marine. This information should assist the different government departments in planning and monitoring the development and utilization of these assets that are of interest to their core role.</p> <p>A framework for an Integrated Coastal Management Plan which includes a Mangrove Management Plan is currently being developed by the Department of Environment in collaboration with partners.</p>

## Fisheries

The Fiji Fisheries Department realizes that there is a lack of capacity to carry out monitoring and data analysis and it is their intention to engage partners to assist. Further work should include gathering existing data and classifying them, identifying missing data and knowledge gaps, drawing a work plan (methodology and associated costs) to collect missing data in the field and carrying out data analysis.

It is the intention of the Fisheries Department to improve enforcement of regulations governing commercial fishing and to review the conditions of fishing licenses in 2012 (*Personal Communication, Viliame Naupoto, Ministry of Fisheries and Forests, March, 2011*).

## Marine Managed Areas

The Fiji National Protected Area Committee (PAC) was established in 2008 under section 8(2) of Fiji's Environment Management Act 2005 as a technical advisory arm to the National Environment Council to advance Fiji's commitments under the Convention on Biological Diversity (CBD)'s Programme of Work on Protected Areas (PoWPA). To date, the PAC has: established national targets for conservation and management; collated existing and new data on species and habitats; identified current protected area boundaries; and determined how much of Fiji's biodiversity is currently protected through terrestrial and marine gap analyses (NBSAP Implementation Framework 2010-2014 for the National Biodiversity Strategy and Action Plan 2007).

A study by Jenkins *et al* (2010) identified areas with high potential of habitat connectivity between terrestrial, freshwater and marine systems most of which are located in the Northern part of the country. The ten highest scoring mapping units for intact connectivity include the remote, largely undeveloped regions in Cakaudrove, Macuata and Bua provinces (Northern Fiji) as well as the northern and eastern side of Taveuni Island. The mapping units with the lowest scores (zero or below) were largely situated around the highly agricultural centres of Nadi, Ba and Labasa, which each have high urban population density, considerable forest clearing for sugar cane, extensive unsealed road networks for agriculture and logging, and records of introduced fish species. Recommendations from this study called for active management in the low scoring areas, such as re-vegetation projects, particularly along waterways

According to Jupiter *et al* (2011), certain provinces e.g. Lau have already expressed interest in establishing Open Ocean protected areas outside fishing ground boundaries.

### **Global Change**

Fiji has begun consultations on its National Climate Change Adaptation Strategy for the Climate Change Policy being developed by the Department of Environment. According to this policy “the sectors identified in the Fiji Climate Change Policy as being most vulnerable to climate change are, (i) agriculture, (ii) coastal zone, (iii) public health and (iv) water resources. These sectors are therefore the foci for adaptation at the national and local levels. The policy covers mainstreaming of climate change issues; to improve climate change data collection, storage and sharing; to promote awareness and understanding of climate change; to implement adaptation actions; to implement mitigation measures; and to ensure Government commitments to regional and international instruments are maintained.” Link: [http://www.fiji.gov.fj/index.php?option=com\\_content&view=article&id=1368:climate-change-policy-for-fiji&catid=71:press-releases&Itemid=155](http://www.fiji.gov.fj/index.php?option=com_content&view=article&id=1368:climate-change-policy-for-fiji&catid=71:press-releases&Itemid=155)

The University of the South Pacific is dealing with the science aspect of climate change and is currently assisting communities (villages) in Fiji to adapt to climate change. This project focuses on rural communities with emphasis on coastal areas and water resources, which are vulnerable to ongoing climate change and important for the livelihood of rural communities. The project has completed the implementation of climate change adaptation in six rural communities so far focusing on, (i) coastal areas (including the coastal zone - beach, coastal land - 30metres from high tide mark and its ecosystem e.g. mangroves and coral reefs and (ii) water resources utilizing a simplified vulnerability and assessment methodology. (Link: <http://www.usp.ac.fj/index.php?id=9843>). From experience in working with communities, lessons learned encompass four main areas: community involvement is essential, support from outside groups is important, information about climate change and adaptation needs to be disseminated and shared, long-term monitoring, maintenance and evaluation is needed (5-10 years) (Aalbersberg *et al*, 2010). As mentioned by Limalevu, 2010, “climate change policy’s strategies, which are directly aligned with this project’s objectives, are:(i) promote soft solutions/ methods to address climate change problems through community participation in seminars and activities like reforestation; and (ii)provide external training to improve and raise public understanding through workshops to promote community stakeholder participation.”



The University of the South Pacific has developed a series of (12) fact sheets on climate related issues and offers a course on climate change impacts and adaptation aimed at officials, NGO workers, community leaders, etc which is now available online. (Link: [http://www.usp.ac.fj/fileadmin/files/Institutes/pacesd/Projects/Climate\\_Change/USP work on adaptation-v4.pdf](http://www.usp.ac.fj/fileadmin/files/Institutes/pacesd/Projects/Climate_Change/USP_work_on_adaptation-v4.pdf)).

### **Multi-sectored, multi-stakeholder consultations**

Mechanisms set up by the Department of Environment should allow wider consultation amongst relevant government departments dealing with coastal development and management. A work-plan for a clearing house mechanism (CHM) has been completed to ensure the effective and efficient flow of information both internally and externally of Fiji on the Convention of Biological Diversity and biodiversity issues of significance nationally and globally. The overall objective of CHM is to increase public awareness of biodiversity issues, which ultimately leads to effective and sound decision making of the conservation and sustainable use of biodiversity at all levels (Department of Environment, 2011. Fiji's Report on the first workshop on clearing house mechanism. Draft).

In addition, as announced by the Ministry of Information in March 2011, Fiji's first Natural Resource Inventory (NRI) as required under the Environment Management Act 2005 has been completed. Cabinet has agreed that the NRI be used for national planning processes. As explained by the Minister for Local Government, Urban Development, Housing and Environment, Colonel Samuela Saumatua, "the NRI is a result of the collation of existing information contributed by various stakeholders and there are six chapters to this report comprising resource inventories for the freshwater, marine, land, agricultural, energy, and mineral sectors." The Minister also explained that "the NRI provides a national baseline in which natural resource developments, specifically those specified under the EMA, should be based from. He said that the information contained should assist the different government sectors in planning and monitoring future utilization of assets that are of interest to their core role." Link: <http://www.fiji.gov.fj/index.php?option=comcontent&view=article&id=3731:15311-cabinet-approves-fijis-first-natural-resource-inventory&catid=71:press-releases&Itemid=155>

A framework for the integrated coastal management plan for Fiji has been drawn up and funding is being sought for consultations (*Personal Communications, Neema Nand, Department of Environment, May 2011*).



*Table 2. Samoa: Summary of findings*

Themes	Findings
Fisheries	<p>The Fisheries Division is addressing the gaps in fisheries data collection, biodiversity research, threat management and fisheries development and management through various activities such as, further collection and documentation of the inshore fisheries biodiversity collection; developing and managing food security; identifying threats to fisheries; developing effective fisheries monitoring systems (to ensure sustainable utilization and management); improving effective management of aggregate spawning species; awareness raising; wide consultations for the coastal fisheries development plan; enhancing capacity of fisheries staff and stakeholders.</p> <p>Samoa plans to develop a national ocean's policy.</p>
Marine Managed Areas	<p>Recent activities have been concentrated on post-tsunami recovery in existing MMA's. However, activities identified for further work in marine managed areas are focused on establishing additional areas, extending existing areas (e.g. Palolo Deep Marine Reserve), the continuation of monitoring and research, review of management plans and improving data dissemination.</p>
Global Change	<p>The Ministry of Natural Resources and Environment (MNRE) is taking the lead to build capacity in mainstreaming to integrate climate change into all programmes such as; water, land and coastal resources, forestry, biodiversity, chemicals management, parks and reserves, disaster management, waste, sanitation, sustainable development and mitigation within the areas of renewable energy.</p> <p>The MNRE is promoting collaboration among regional centers and networks for improved support of Parties to the UNFCCC in assessing the impacts of climate change, making informed adaptation plans and enhancing the capacity for implementing National Adaptation Programmes of Action (NAPAs).</p> <p>The draft State of the Environment report of 2006 was reviewed in 2010 to update it by including environmental changes and identifying gaps to be addressed in the final report.</p>
Multi-sectored, multi-stakeholder consultations	<p>Multi-sectoral environmental issues are addressed through the MNRE's programmes and projects under various divisions including forestry, land management, meteorology, water resources, planning and urban management agency, environment and conservation.</p>

## Fisheries

Samoa has a relatively small coral reef area compared to Fiji, Tonga and Tuvalu extending over 490km<sup>2</sup>. Therefore, it is a great challenge to manage coral reef resources to meet both the food security and biodiversity requirements. The key gaps in the knowledge of marine biodiversity include ecological knowledge of native species in general but especially, of threatened corals and fish. In addition, according to the report on priority sites for conservation in Samoa, existing fisheries regulations should be strengthened, promoted and enforced (Conservation International *et al*, 2010).

The Fisheries Division is addressing the gaps through its inshore section annual plan of 2010-2011 given its current resources and capacity in addition to coping with the post-tsunami recovery activities (*Personal Communication, Joyce Samuelu Ah Leong, Fisheries Division, June 2011*).

## Marine Managed Areas

Key stakeholders in Samoa have identified Key Biological Areas (KBAs) for maintaining effective ecological networks aimed at preventing biodiversity loss. The total area of marine KBAs in Samoa is about 173 km<sup>2</sup> (23% of the inshore reef area of Samoa). The area of marine KBAs with some form of protection is approximately 108km<sup>2</sup>, or 14% of the inshore reef area of Samoa. KBAs capture key habitat for 6 of the 17 vertebrates currently classified as threatened on the IUCN Red List and at least 6 of the 48 coral species listed. The other 53 species may occur in the KBA network but the datasets are insufficient to verify their presence or absence currently. Suitable models of successfully managed marine areas exist in the Aleipata and Safata MPAs and village fish reserves (Conservation International *et al*, 2010).

## Global Change

The Ministry of Natural Resources and Environment (MNRE) is the ideal agency to integrate climate change issues into all programmes as there are six divisions within this ministry (forestry, land management, meteorology, water resources, planning and urban management agency, environment and conservation). Link: <http://www.mnre.gov.ws>

## Multi-sectored, multi-stakeholder consultations

The MNRE through various programmes and projects is focusing on capacity building to enable better implementation of environmental policies. In the past, policy reviews have been intermittent and implementation has been somewhat slow probably due to lack of capacity. In addition, interaction between the six divisions of MNRE may be difficult.

Link: <http://www.mnre.gov.ws>

Table 3. Tonga: Summary of findings

Themes	Findings
Fisheries	Gaps in species conservation, marine biodiversity information, decline in coastal fisheries and improved enforcement of fisheries legislation are being addressed by the Department of Fisheries and partners through programmes/projects including the National Biodiversity Strategy Action Plan (NBSAP).
Marine Managed Areas	Marine managed areas are used for different conservation purposes by the Ministry of Environment and Climate Change and the Department of Fisheries which is the reason for different names. However, both agencies use physical markers.
Global Change	<p>Tonga has made good progress on the Millennium Development Goals and has completed the second report. Although the Ministry of Environment and Climate Change (MECC) has not yet established their clearing house mechanism, it has established a database containing all the reports which have been written on climate change issues.</p> <p>Tonga has made significant progress with regards to addressing climate change issues pertaining to its obligations under the United Nations Framework Convention on Climate Change (UNFCCC) through development of national policies, legislation and action plans.</p>
Multi-sectored, multi-stakeholder consultations	There is a more structured form of collaboration amongst the key stakeholders although this is driven by projects with external funding.

## Fisheries

Community-based Special Management Areas (SMAs) have been set up to address issues of declining fisheries and the Department of Fisheries monitors these SMAs which serve to enhance fisheries, especially the vulnerable invertebrate species such as giant clam, *Trochus* and sea cucumber. Re-stocking of these species by the Department of Fisheries continues. Fish Aggregating Devices (FADs) in coastal areas are used by recreational and artisanal fishers. Fisheries are encouraging the use of FADs for hand lining and the use of mini long-lining to divert pressure away from the inshore fisheries. Other restrictions include a closed season for harvest of mullet from June to July during the breeding season, a total ban on leatherback turtle harvesting and a closed season for harvest of the rest of the turtle species (males only), a ban on harvest of live rock and bêche-de-mer (*Personal Communication, Poasi Ngaluafe and Mele Tauati, Division of Fisheries, April 2010*).

Currently the GEF Small Grants programme administered by Civil Society Forum of Tonga provides funding for such enforcement, management, and capacity building of 3 SMAs including Atata on Tongatapu and 2 sites in Ha'apai. The role of the Department of Fisheries is to provide training for communities. An allocation is provided by the GEF small grant to

support enforcement through the provision of fuel for boats to patrol the SMAs (*Personal Communication, Siale 'Ilplahia, Civil Society Forum of Tonga, April 2011*).

Lessons learned by the Department of Fisheries include, having simple survey methodologies to suit the local situation. In order to obtain good scientific information on marine biodiversity there is also a need for good representation of sites when sampling. It is difficult to standardize methodologies but there should be clear objectives and evidence of rigorous monitoring. Ongoing collaboration between major stakeholders (Department of Fisheries, MECC and communities) is necessary to address the decline in coastal fisheries. The Department of Fisheries realizes that there is more fishing pressure in the main center as compared to outer islands due to higher monetary obligations therefore more enforcement in this area is necessary (*Personal Communication, Mele Tauati, Fisheries Division, April 2011*).

### **Marine Managed Areas**

The MECC have plans to put in place Marine Protected Areas (MPAs) boundary markers and do some ground truthing. There is a need to re-survey reefs before boundaries are established and to address the issue of the use of visual markers (buoys) which attract illegal fishers. The MPAs in Va'vau are working and there are plans to establish more MPAs in the outer islands under the Biodiversity project. From a recent survey of marine parks and reserves, it was found that the health of the reefs was in reasonably good condition and showed recovery from coral damage by boat anchors (*Personal Communication, Lupe Matoto, Ministry of Environment and Climate Change, April, 2011*).

The Department of Fisheries deal with Special Management Areas (SMAs) and numbers continue to increase each year. Currently there are 6 SMAs and 2 additional sites are being processed. More communities are showing interest. However, enforcement of these is a challenge. Economic incentives for communities are necessary i.e. re-stocking species of high value and easy to maintain so that this will contribute to people's livelihoods. In addition, the technology and information transfer from qualified and experienced Fisheries staff to communities is needed for long-term benefits especially if Fisheries staff move/leave (*Personal Communication, Mele Tauati and Pau Likiliki, Division of Fisheries, April 2010*).

It is difficult to collaborate with other departments for monitoring of marine managed areas and more collaboration is needed to share resources and be more efficient in data collection. Collaboration would be easier if the main stakeholders can relate their work to those of others and see how the different sectors all contribute to the improvement of livelihoods.

Regular awareness is done through distribution of written material and through audio means. There is a need for more of this in addition to material written in the local language (*Personal Communication, Mele Tauati, Division of Fisheries, April 2010*).

There have been recent incidences of poaching in protected areas in Ha'apai, one of the remote islands (*Personal Communication, Mele Tauati, April 2010*).

## Global Change

During the launch of Tonga's second report on its progress towards achieving the UN's Millennium Development Goals (MDGs), in January 2011, it was mentioned that the country has met or is very close to meeting three of the eight goals and all their targets and is faring very well with the other goals including environmental sustainability.

Link: <http://www.taimionline.com/articles/1559>

The Government of Tonga has made significant progress in addressing climate change issues pertaining to its obligations under the United Nations Framework Convention on Climate Change (UNFCCC). "These include, the inclusion of environment sustainability and climate change- as one of the priority goals in its National Strategic Planning Framework 2009-2014; the integration of climate change mitigation and adaption issues into sectoral policies, planning and development programs; the enactment of environmental sustainability legislation, 2003-2010 and the development of the Tonga's Joint National Action Plan on Climate Change Adaptation and Disaster Risk Management, 2010-2015; and the implementation of climate change adaptation projects (PACC,GIZCCPIR,MESCAL) in the island kingdom." Link: [http://www.mecc.gov.to/index.php?option=com\\_content&view=section&id=14&Itemid=54](http://www.mecc.gov.to/index.php?option=com_content&view=section&id=14&Itemid=54)

## Multi-sectored, multi-stakeholder consultations

The Ministry of Environment and Climate Change (MECC) operates in accordance with its 2010- 2013 Corporate Plan which has systems in place to address emerging national environmental issues. The Environment Management Act 2010 guides the Ministry in its monitoring and enforcement activities. "The Ministry's vision is to achieve "sustainable development for Tonga's present and future generations through coordinated environmental management and protection, climate change mitigation and adaptation and sustainable management of the energy sector." Link: <http://www.mecc.gov.to>

The Ministry of Tourism (MOT) is assisting in development activities in Special Management Areas (SMAs) and Marine Protected Areas (MPAs) with the Fisheries Division and the Ministry of Environment and Climate Change (MECC) respectively. The MOT is trying to decentralize staff to other islands and is working with MECC and others to regulate tourism activities (*Personal Communication, Sita Tu'ihalama, Ministry of Tourism, April 2011*).

Table 4. *Tuvalu: Summary of findings*

Themes	Findings
Fisheries	<p>The Department of Fisheries will be guided by the revised Fisheries Act and projects with relevant partners to address the gaps in biodiversity information, species conservation, enforcement of fisheries regulations, capacity building in fisheries monitoring and assessments and awareness raising.</p> <p>In addition, the roadmap included in the institutional strengthening scoping study report produced by Tuvalu's Ministry of Natural Resources and Environment, Department of Fisheries and the Pacific Islands Forum Fisheries Agency in 2010 will allow for improved management and development of fisheries resources and livelihoods.</p>
Marine Managed Areas	Combined efforts of non-government organizations and the Tuvalu government are addressing issues relevant to marine managed areas such as enforcement, standard survey methodology, marine resource inventory, linkage to national strategies and community engagement.
Global Change	National climate change activities are currently being addressed by the government's National Adaptation Programme of Action (NAPA) and non-government organization projects. In addition, the upcoming National Climate Change Policy (NCCP) and Joint Climate Change Adaptation and Disaster Risk Management National Action Plan (JNAP) will compliment these activities.
Multi-sectored, multi-stakeholder consultations	It is clear that a more coordinated effort is needed for the management and conservation of the environment in particular, marine resources and waste management.
National Laws	The greatest need is to link the Falekaupule and Conservation Area Acts and this may be achieved through by the development of the national climate change policy.

## Fisheries

Subsistence activities dominate Tuvalu's fisheries sector of which about 75% percent of the fish landings are oceanic species, predominantly tuna. Fisheries conservation, management and development are the responsibility of the Fisheries Department of the Ministry of Natural Resources and Lands and the Police Maritime Wing provides surveillance support. License fees from foreign tuna vessels are very significant to the economy of Tuvalu, contributing up to 50% of total government revenue in some years. Link: <http://acpfish2-eu.org/index.php?page=tuvalu&hl=fr>

The lack of financial and technical resources faced by the Fisheries Department have been addressed by the Institutional Strengthening Scoping Study Report, drafted by Tuvalu's

Ministry of Natural Resources and Environment and Department of Fisheries and the Pacific Islands Forum Fisheries Agency in 2010. This report provides a roadmap for improved management and development of fisheries resources and livelihoods over a period of four years. The roadmap includes key social issues such as cultural impact, gender, poverty reduction and environmental impact. Factors in the design to promote sustainability include continuous community input and measures taken to reduce staff turnover in the small island country. Link: <http://www.pimrisportal.org>

### **Marine Managed Areas**

The management and enforcement of marine protected areas is hindered to some extent by the lack of linkage between customary law and national legislation (i.e. Falekaupule Act and the Conservation Areas Act). Despite this constraint, combined efforts of non-government organizations and the Tuvalu government are working towards improving marine conservation through data collection, consultations with stakeholders and community awareness (*Personal Communication, Melton Tauetia, Ministry of Natural Resources and Environment, April 2011*).

### **Global Change**

Systems have been established to facilitate the development of the National Climate Change Policy (NCCP) and the Joint Climate Change Adaptation and Disaster Risk Management National Action Plan (JNAP). A national climate change policy has been a key requirement of the Te Kakeega II since 2005. According to SPREP Pacific Futures Programme Manager Dr Netatua Pelesikoti, “the policy provides a framework to ensure sector policies and action plans consider the impact of climate change, and adaptations help minimize the impacts and increase resilience. For example, mainstreaming climate change into water policy; outer island development; infrastructure development and so forth will all contribute to a coordinated response to climate change challenges thus subsequently contributing to achieving the visions, goals and objectives of Te Kakeega II.” It is expected that a work- plan including a timeframe for the completion of the policy will be done before October 2011. Link: [http://www.sprep.org/climate\\_change/pacc/pacc\\_news\\_detail.asp?id=925](http://www.sprep.org/climate_change/pacc/pacc_news_detail.asp?id=925)

### **Multi-sectored, multi-stakeholder consultations**

Although there have been some combined efforts in the management and conservation of the environment, implementation of environmental legislation has been rather slow. Most of the combined efforts seem to be focused on climate change initiatives.

### **National Laws**

As a result of the slow process of implementing environment legislation, there is a need to review and update many of them and in particular the Te Kakeega II (National Strategy for Sustainable Development 2005-2015).



## CONCLUSION

The aim of bringing Pacific Leaders together with scientists and experts on the sustainable management of coral reefs was achieved. Using the most recent information available, Pacific leaders were apprised of the impacts of global change and of those factors that are having an affect on the health of their coral reefs. It was envisaged that the recommendations on the four themes (fisheries, marine managed areas, global change and multi-sectoral, multi stakeholder consultations) from the in-country workshops would be implemented to some extent.

The findings indicated that the challenges surrounding coral reef conservation and management efforts in the Pacific Islands region have not changed much over the last decade. Challenges include: lack of biodiversity data and information, absence and lack of ongoing and long-term marine research, fisheries survey and monitoring programmes; limited public awareness and education programmes; limited in-country skills/ capacity to provide leadership in marine species conservation management; limited national management mechanisms to protect marine organisms and their habitats; lack of resources, including accessing sustained funding; and limited information exchange, linkages and collaboration.

People in the target countries are custodians of some of the richest marine biodiversity in the world, but are seriously hampered in development of comprehensive national marine inventories because of lack of taxonomic expertise. If current trends continue, there will be a crisis in food supply within the next 25 years. Alternative life-styles need to be developed as wild fish stocks decline, and aquaculture may be a partial solution to address future food shortages. Establishment and monitoring of marine managed areas is vital to the sustainable management of coral reefs now and in the future and community engagement is vital to this.

## FUTURE DIRECTIONS

- ▶ Upgrade the National Marine Biodiversity Inventories for surveys in Tonga, Samoa and Tuvalu
- ▶ Introduce the Seagrass Watch programme recommended for Tonga and Samoa
- ▶ Develop a regional climate change clearing house, preferably at USP
- ▶ Carry out more capacity building in all countries
- ▶ Address the disconnection between communities, government and other players
- ▶ Harmonise projects so as to have better coordination among agencies
- ▶ Assist with the marine science programme at the National University of Samoa
- ▶ Raise public awareness of coral reef issues, and to find ways of introducing relevant curriculum in schools
- ▶ Reactivate the *Two Samoas* initiative
- ▶ Facilitate attachments of USP students with their home governments
- ▶ Introduce coral identification training in Tonga, Samoa and Tuvalu
- ▶ Encourage closer cooperation with SPREP on coral reef and coral reef management issues
- ▶ Encourage good governance at the community level
- ▶ Continue monitoring in support of government policies and create relevant statistics on stock and fishing in order to understand trends
- ▶ Establish more Marine Managed Areas

## REFERENCES

Aalbersberg, W., Dumar, P., Limalevu, L. & Weir, T. 2010. *Community adaptation in Fiji: some lessons learned*. PACE-SD Occasional Paper 2010/1. Suva, Fiji: University of the South Pacific.

Conservation International – Pacific Islands Programme, Ministry of Natural Resources and Environment, Secretariat of the Pacific Regional Environment Programme. 2010 *Priority Sites for Conservation in Samoa: Key Biodiversity Areas*. Apia, Samoa: SPREP. 32pp.

Fiji. Department of Environment. 2010. *Implementation framework 2010-2014 for the national biodiversity strategy and action plan 2007*. Unpublished report. Suva, Fiji: DoE.

Fiji. Department of Environment. 2011. *Draft report on the first workshop on national clearing house mechanism*. Unpublished report. Suva, Fiji: DoE.

Jenkins, A.P., Jupiter, S.D., Qauqau, I., Atherton, J. (2010). The importance of ecosystem-based management for conserving migratory pathways on tropical high islands: a case study from Fiji. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 20: 224-238.

Jupiter, S., Tora, K., Mills, M., Weeks, R., Adams, V., Qauqau, I., Nakeke, A., Tui, T., Nand, Y., Yakub, N. 2011. *Filling the gaps: identifying candidate sites to expand Fiji's national protected area network. Outcomes report from provincial planning meeting, 20-21 September 2010*. Suva, Fiji: Wildlife Conservation Society. 65 pp.

Limalevu, L. 2010. *Climate Change Adaptation in Rural Communities in Fiji: Proceedings of the Concluding Workshop of the Climate Change Adaptation in Rural Communities in Fiji Project, Suva, Fiji, 24-25 June, 2010*. Suva, Fiji: Pacific Centre of Environment and Sustainable Development, USP.

## WEBSITES

[http://www.fiji.gov.fj/index.php?option=com\\_content&view=article&id=1368:climate-change-policy-for-fiji&catid=71:press-releases&Itemid=155](http://www.fiji.gov.fj/index.php?option=com_content&view=article&id=1368:climate-change-policy-for-fiji&catid=71:press-releases&Itemid=155);  
<http://www.usp.ac.fj/index.php?id=9843>;  
[http://www.usp.ac.fj/fileadmin/files/Institutes/pacesd/Projects/Climate\\_Change/USP\\_work\\_on\\_adaptation\\_v4.pdf](http://www.usp.ac.fj/fileadmin/files/Institutes/pacesd/Projects/Climate_Change/USP_work_on_adaptation_v4.pdf);  
[http://www.fiji.gov.fj/index.php?option=com\\_content&view=article&id=1368:climate-change-policy-for-fiji&catid=71:press-releases&Itemid=155](http://www.fiji.gov.fj/index.php?option=com_content&view=article&id=1368:climate-change-policy-for-fiji&catid=71:press-releases&Itemid=155);  
<http://www.mnre.gov.ws>;  
<http://www.taimionline.com/articles/1559>;  
[http://www.mecc.gov.to/index.php?option=com\\_content&view=section&id=14&Itemid=54](http://www.mecc.gov.to/index.php?option=com_content&view=section&id=14&Itemid=54);  
<http://www.mecc.gov.to>;  
<http://acpfish2-eu.org/index.php?page=tuvalu&hl=fr>;  
<http://www.pimrisportal.org>;  
[http://www.sprep.org/climate\\_change/pacc/pacc\\_news\\_detail.asp?id=925](http://www.sprep.org/climate_change/pacc/pacc_news_detail.asp?id=925)

## APPENDIX 1

### Workshop Programme and Participant List- Fiji, Samoa, Tonga & Tuvalu

#### 1. FIJI WORKSHOP PROGRAMME

Global Change & Coral Reef Management in the Pacific: Engaging Scientists and Policy Makers (June 9<sup>th</sup> – 10<sup>th</sup>, 2010: The University of the South Pacific, Suva, Fiji)

#### Wednesday June 9<sup>th</sup>

Ms Shirleen Bala and Ms Prerna Chand, Institute of Marine Resources – Rapporteurs

TIME	PRESENTATION	PRESENTER
8.30am	Welcome; dedication	Teddy Fong Econesian (USP)
9.00am	Programme Outline, Objectives and Outcomes	Dr Joeli Veitayaki (Division of Marine Studies, USP)
9.15am	Fiji Coral Reef Monitoring Network	Cherie Morris (Inst. of Marine Resources, USP)
9.30am	Socio economic and governance impacts of MMAs in Fiji	Sakiusa Fong (Inst. of Applied Science, USP)
9.45am	Translating the regional ocean policy into a national action plan	Dr Joeli Veitayaki (School of Marine Studies, USP)
10.15am	Development of a national integrated coastal management plan for Fiji	Prof. Bill Aalbersberg (Inst. of Applied Science, USP)
10.45am	MORNING TEA	
11.15am	Impacts of global change on Fiji's coastal communities	Leone Limalevu
11.45am	Status of policies and legislation in support of sustainable management of Fiji's coral reefs	Viliame Naupotu (Permanent Secretary, Ministry of Forests and Fisheries)
12.15pm	Discussion on the morning session	Dr Joeli Veitayaki
1.00pm	LUNCH	
2.00pm	Break-out group discussion towards a coral reef action plan for Fiji	
3.00pm	AFTERNOON TEA	
3.30pm	Plenary: Groups report on discussion	
5.00pm	COCKTAIL	

#### Thursday June 10<sup>th</sup>

TIME	PRESENTATION	PRESENTER
8.30am	Panel discussion: Science and coral reefs	Moderators: Cherie Morris and Prof.

	in Fiji & socio-economic & policy issues	Robin South
9.00am	Community-based management and fisheries protection	James Comley (Institute of Applied Science, USP)
9.30am	Sustainability issues in the aquarium trade	Walt Smith (Walt Smith International)
10.00am	Resilience of coral reefs in Fiji	Ed Lovell (Division of Marine Studies, USP)
10.30am	MORNING TEA	
11.00am	Science of climate change	Prof. Murari Lal (Pacific Center for Environment and Sustainable Development, USP)
11.30am	Physical oceanography and impacts on coral reef morphology and coral communities	Jens Kruger (SOPAC)
12.00pm	National biodiversity strategic action plan	Eleni Tokaduadua (Department of Environment)
12.30am	Environment Management Act on Environment Impact Assessment implications	Joep Davetanivalu (Department of Environment)
1.00pm	LUNCH	
2.00pm	Synopsis of the panel discussions and proposals for break-out group topics	
3.00pm	AFTERNOON TEA	
3.30pm	Break-out groups	
4.30pm	Plenary: Reports from break-out groups	
5.00pm	Wrap-up: the way forward	
6.00pm	COCKTAIL	

### Participant List

- |   |   |  |
|---|---|--|
| 1 | Viliame Naupoto, Ministry of Fisheries and Forests  | <a href="mailto:viliame.naupoto@gmail.com">viliame.naupoto@gmail.com</a>         |
| 2 | Sereima Dovibua, Ministry of Lands and Minerals   | <a href="mailto:sdovibua@mrd.gov.fj">sdovibua@mrd.gov.fj</a>                     |
| 3 | Peni Ratumaitavuki, Ministry of Provincial Development, Multi Ethnic Affairs, Natural Disaster Management and Sugar | <a href="mailto:pratumaitavuki@govnet.gov.fj">pratumaitavuki@govnet.gov.fj</a>   |
| 4 | Waisele Delai, Ministry of Health   | <a href="mailto:wdelai@health.gov.fj">wdelai@health.gov.fj</a>                   |
| 5 | Josaia Toduadua, Ministry of Education  | <a href="mailto:Josaia.toduadua@govnet.gov.fj">Josaia.toduadua@govnet.gov.fj</a> |
| 6 | Milika Naqasima-Sobey, International Union for Conservation of Nature   | <a href="mailto:milika.sobey@iucn.org">milika.sobey@iucn.org</a>                 |

- 7 Cherie Morris, Institute of Marine Resources, University of the South Pacific  
[morris\\_c@usp.ac.fj](mailto:morris_c@usp.ac.fj)
- 8 Sakiusa Fong, Institute of Applied Sciences, University of the South Pacific  
[patrick.fong@usp.ac.fj](mailto:patrick.fong@usp.ac.fj)
- 9 Dr Joeli Veitayaki, School of Marine Studies, University of the South Pacific  
[veitayaki\\_j@usp.ac.fj](mailto:veitayaki_j@usp.ac.fj)
- 10 Bill Aalbersberg, Institute of Applied Sciences, University of the South Pacific  
[william.aalbersberg@usp.ac.fj](mailto:william.aalbersberg@usp.ac.fj)
- 11 Leone Limalevu, Pacific Centre for Environment and Sustainable Development,  
University of the South Pacific  
[limalevu\\_le@usp.ac.fj](mailto:limalevu_le@usp.ac.fj)
- 12 James Comley, Institute of Applied Sciences, University of the South Pacific  
[comley\\_j@usp.ac.fj](mailto:comley_j@usp.ac.fj)
- 13 Walt Smith, Walt Smith International  
[walt@waltsmith.com](mailto:walt@waltsmith.com)
- 14 Edward Lovell, School of Marine Studies, University of the South Pacific  
[lovell\\_e@usp.ac.fj](mailto:lovell_e@usp.ac.fj)
- 15 Murari Lal, Pacific Centre for Environment and Sustainable Development, University of the  
South Pacific  
[lal\\_m@usp.ac.fj](mailto:lal_m@usp.ac.fj)
- 16 Jens Kruger, Pacific Islands Applied Geoscience Commission  
[jkruger@sopac.org](mailto:jkruger@sopac.org)
- 17 Eleni Tokaduadua, Ministry of Environment  
[etokaduadua2@environment.gov.fj](mailto:etokaduadua2@environment.gov.fj)
- 18 Jope Davetanivalu, Ministry of Environment  
[JDavetanivalu@govnet.gov.fj](mailto:JDavetanivalu@govnet.gov.fj)

## 1. SAMOA WORKSHOP PROGRAMME

Global Change & Coral Reef Management in the Pacific: Engaging Scientists and Policy Makers (August 11<sup>th</sup> - 12<sup>th</sup>, 2010: The University of the South Pacific- Alafua Campus Lodge Fale, Alafua, Samoa)

### Wednesday August 11<sup>th</sup>

Ms Cherie Morris, Institute of Marine Resources – Rapporteur

TIME	PRESENTATION	PRESENTER
8:30am	Welcome & Workshop Opening	Taulealeausumai Laavasa Malua (Chief Executive Officer, Ministry of Natural Resources and Environment)
9:00am	Program outline, objectives & outcomes	Prof G. Robin South (Institute of Marine Resources, USP Alafua)
9:15am	Status of reefs and impacts of global change in the Pacific	Clive Wilkinson (Global Coordinator GCRMN: Reef and Rainforest Research Center, Australia)
9:45am	Status of coral reefs in Samoa	Faleafaga Toni Tipamaa (Acting Chief Executive Officer, Department of Environment and Conservation)
10:15am	DVD: Coral reefs – A casualty of climate change	
10:45am	MORNING TEA	
11:15am	Impacts of global change on coastal communities	Leone Limalevu (Pacific Center for Environment and Sustainable Development, USP Laucala)
12:15pm	Translating the regional oceans policy into a national action plan	Dr Joeli Veitayaki (Division of Marine Studies, USP Laucala)
12:45pm	Summary of morning session	Dr Joeli Veitayaki
1:00pm	LUNCH	
2:00pm	Status of reef/coastal fisheries & management measures in Samoa	Olofa Tuaopepe Acting (Acting Chief Executive Officer, Fisheries Department)
2:30pm	Status of fisheries from the private sector viewpoint	Kat Kapsch (AquaSamoa)
3:00pm	MPAs in Samoa	Malama Momoemausu (Ministry of Natural



		Resources and Environment)
3:30pm	AFTERNOON TEA	
4:00pm	Fisheries reserves from the monitoring perspective	Joyce Ah Leong (Inshore Fisheries Division, Ministry of Agriculture and Fisheries)
4:30pm	Round-up Day 1 discussions	Dr Joeli Veitayaki (Facilitator)
5:00pm	CLOSE OF DAY 1	

### Thursday August 12th

TIME	PRESENTATION	PRESENTER
9:00am	Workshop objectives of Day 2	Prof G. Robin South
9:15am	Coral reef management & climate change in American Samoa	Hideyo Hattori (Coral Reef Advisory Group, American Samoa)
9:45am	NGO Engagement with global change and management issues of coastal and reef habitats in Samoa	Tavita Faletese (Principal Project Officer METI)
10:30am	MORNING TEA	
11:00am	Input from the participants on issues raised and on new issues	ALL
12:00pm	Synopsis of issues and discussions: Day 1 & 2	Joeli Veitayaki (Facilitator)
1:00pm	LUNCH	
2:00pm	Development of a coral reef action plan for Samoa	Group discussions
3:30pm	AFTERNOON TEA	
4:00pm	Plenary – Reports from group discussions	ALL
5:00pm	Wrap-up: The way forward	
5:30pm	CLOSING SESSION	
6:00pm	COCKTAIL	

### Participant List

- 1 Anita Iosefa, Samoana Resort
- 2 Jon Long, Samoana Resort
- 3 Hideyo Hattori, Coral Reef Advisory Group, American Samoa
- 4 Clare Shelton, Coral Reef Advisory Group, American Samoa
- 5 Juney Ward, Ministry of Natural Resources & Environment

[anitasamoana@yahoo.com](mailto:anitasamoana@yahoo.com)

[captaintube@gmail.com](mailto:captaintube@gmail.com)

[hideyo.hattori@doc.as](mailto:hideyo.hattori@doc.as)

[clare.shelton@doc.as](mailto:clare.shelton@doc.as)

[juney.ward@mnre.gov.ws](mailto:juney.ward@mnre.gov.ws)

- 6      Ulusapeti Tiitii, Fisheries Division, Ministry of Agriculture & Fisheries  
[sapeti.tiitii@fisheries.gov.ws](mailto:sapeti.tiitii@fisheries.gov.ws)
- 7      Joyce Samuelu Ah Leong, Fisheries Division, Ministry Agriculture & Fisheries  
[joyce.samuelu@fisheries.gov.ws](mailto:joyce.samuelu@fisheries.gov.ws)
- 8      Lameko Tosimale, Ministry of Health  
[lameko@health.gov.ws](mailto:lameko@health.gov.ws)
- 9      Mosilava Elisaia Talouli, Ministry of Natural Resources & Environment  
[elisaia.talouli@mnre.gov.ws](mailto:elisaia.talouli@mnre.gov.ws)
- 10     Faleafaga Toni Tipamaa, Ministry of Natural Resources & Environment  
[toni.tipamaa@mnre.gov.ws](mailto:toni.tipamaa@mnre.gov.ws)
- 11     Va'asili'ifiti Moelagi Jackson, Samoa Umbrella for Non-Government Organizations/ Faasao Savai'i Society  
[vaasilimj@gmail.com](mailto:vaasilimj@gmail.com)
- 12     Taramara Talauta, Ministry Women, Culture & Social Development      [tara.2707@gmail.com](mailto:tara.2707@gmail.com)
- 13     Faainuseiamalie Latu, National University of Samoa  
[f.latu@nus.edu.ws](mailto:f.latu@nus.edu.ws)
- 14     Togia Tavita Faletoese, Matuaileoo Environment Trust Inc.  
[tavita@meti.ws](mailto:tavita@meti.ws)
- 15     Ollie Reupena, GEF UNDP  
[ollie.reupena@undp.org](mailto:ollie.reupena@undp.org)
- 16     Kuinimeri Finau, Scientific Research Organization of Samoa  
[kuini.finau@sros.org.ws](mailto:kuini.finau@sros.org.ws)
- 17     Dora Esera, Ministry of Natural Resources & Environment  
[dora.esera@mnre.gov.ws](mailto:dora.esera@mnre.gov.ws)
- 18     Malama Momoemausu, Ministry of Natural Resources & Environment  
[malama.momoemausu@mnre.gov.ws](mailto:malama.momoemausu@mnre.gov.ws)
- 19     Kat Kapsch, Aquasamoa  
[dive@aquasamoa.com](mailto:dive@aquasamoa.com)
- 20     Steve Roast, Aquasamoa  
[dive@aquasamoa.com](mailto:dive@aquasamoa.com)
- 22     Paul Anderson, South Pacific Regional Environment Programme  
[Paul@sprep.org](mailto:Paul@sprep.org)

**Note: Funding sources outside the APN**

The participation of Dr Clive Wilkinson at the Samoa workshop was funded by the Global Coral Reef Monitoring Network and related donors.

## 2. TONGA WORKSHOP PROGRAMME

Global Change & Coral Reef Management in the Pacific: Engaging Scientists and Policy Makers (August 3<sup>rd</sup> - 4<sup>th</sup>, 2010: The University of the South Pacific- Tonga Campus)

### Tuesday August 3<sup>rd</sup> (Afternoon)

Ms Shirleen Bala, Institute of Marine Resources – Rapporteur

TIME	PRESENTATION	PRESENTER
2.15pm	Welcome and Opening	Hon. Lord Ma'afu (Minister, Ministry of Environment and Climate Change)
2.30pm	Programme Outline, Objectives and Outcomes	Joeli Veitayaki (Division of Marine Studies, USP)
2.45pm	Status of policies and legislation in support of sustainable management of Tonga's coral reefs	Asipeli Palaki (Ministry of Environment and Climate Change)
3.15pm	AFTERNOON TEA	
3.45pm	Translating the regional oceans policy into a national action plan	Dr Joeli Veitayaki (Division of Marine Studies, USP)
4.15pm	Impacts of global change on coastal communities	Leone Limalevu (PACE, USP)
4.45pm	Discussion	Joeli Veitayaki
5.30pm	CLOSE OF DAY 1	

### Wednesday August 4<sup>th</sup>

TIME	PRESENTATION	PRESENTER
9.00am	Environmental issues in the sustainable management and development of Tonga's coral reefs, including current status of marine protected areas.	Kathy Zischka (Ministry of Environment and Climate Change)
9.30am	Current status of special management areas	Siola Malimali (Department of Fisheries)
10.00am	MORNING TEA	
10.30am	The importance of healthy coral reefs for the development of Tonga's	Ms Akosita Tu'ihalamaka (Ministry of Tourism)

	tourism industry	
11.00am	DVD on coral reefs: a casualty of climate change	
11.30am	Discussion	
12.30pm	LUNCH	
2.00pm	Break-out group discussion	
3.00pm	AFTERNOON TEA	
3.30pm	Plenary: Reports of groups	
5.00pm	Recommendations and outcomes	
6.00pm	COCKTAIL	

### Participant List

- 1 Siale 'Ilolahia, Civil Society Forum of Tonga [csft@kalianet.to](mailto:csft@kalianet.to)
- 2 Dorothy Kwansing, Ministry of Environment and Climate Change [eritakwan@gmail.com](mailto:eritakwan@gmail.com)
- 3 Poasi Ngaluafu, Department of Fisheries [poasif@tongafish.gov.to](mailto:poasif@tongafish.gov.to)
- 4 Pau Likiliki, Fishing Industry Association of Tonga [tongafishing@gmail.com](mailto:tongafishing@gmail.com)
- 5 Mele Tauati, Fisheries Department [imakasini@tongafish.gov.to](mailto:imakasini@tongafish.gov.to)
- 6 Leveni 'Aho, Ministry of Works [levenih5@gmail.com](mailto:levenih5@gmail.com)
- 7 Kelela Tonga, Ministry of Transport- Marine Division [Kelelafunak@yahoo.com](mailto:Kelelafunak@yahoo.com)
- 8 'Ofa Finau, Ministry of Transport- Marine Division [07finau@yahoo.com](mailto:07finau@yahoo.com)
- 9 Siola'a Malimali, Department of Fisheries [malimali@tongafish.gov.to](mailto:malimali@tongafish.gov.to)
- 10 Soana 'Otuafi, Ministry of Environment and Climate Change [soanaotuafi@yahoo.com](mailto:soanaotuafi@yahoo.com)
- 11 Eileen Fonua, Tonga Institute of Education [eileenfonua@gmail.com](mailto:eileenfonua@gmail.com)
- 12 Alifaleti Fonua, Tonga Institute of Education [S99004462@student.usp.ac.fj](mailto:S99004462@student.usp.ac.fj)
- 13 Sione Fulivai, Ministry of Environment and Climate Change [talo@is@hotmail.com](mailto:talo@is@hotmail.com)
- 14 Asipeli Palaki, Ministry of Environment and Climate Change [a\\_palaki@yahoo.com](mailto:a_palaki@yahoo.com)
- 15 Sita Tu'ihalamaka, Ministry of Tourism [zida\\_krs@hotmail.com](mailto:zida_krs@hotmail.com)
- 16 Kathy Zischka, Ministry of Environment and Climate Change [k\\_zischka@hotmail.com](mailto:k_zischka@hotmail.com)

### 3. TUVALU WORKSHOP PROGRAMME

Global Change & Coral Reef Management in the Pacific: Engaging Scientists and Policy Makers (August 18<sup>th</sup>, 2010: Vaiaku Lagi Hotel Conference Room, Funafuti)

#### Wednesday August 18<sup>th</sup>

Ms Cherie Morris, Institute of Marine Resources – Rapporteur

TIME	PRESENTATION	PRESENTER
8:30am	Dedication: Welcome & Workshop Opening	Hon Minister NRE: Tavau Teii
9:00am	Program outline, objectives & outcomes	Prof G. Robin South (Institute of Marine Resources, USP Alafua)
9:15am	Status of reefs and impacts of global change in the Pacific	Clive Wilkinson (Global Coordinator GCRMN: Reef and Rainforest Research Center, Australia)
9:30am	Status of coral reefs in Tuvalu	Tupulaga Poulasi (Department of Fisheries)
9:45am	Towards sustainable reef fisheries management in Tuvalu	Seve Lausavere (Permanent Secretary, Ministry of Natural Resources and Environment)
10:00am	DVD: Coral reefs – A casualty of climate change	
10:30am	MORNING TEA	
11:00am	Impacts of global change on coastal communities	Leone Limalevu (PACE-SD, USP Laucala)
11:15am	Climate change projects	Melton Tauetia (Climate Change Officer, Ministry of Natural Resources and Environment)
11:30am	Traditional marine resource management/ By-laws	Semese Alefaio, Civil Society
11:45am	Status of fisheries from the private sector	Semese Alefaio, Civil Society
12:00pm	Input from the participants on issues raised and on new issues	Joeli Veitayaki (Division of Marine Studies, USP Laucala)
12:30pm	Translating the regional oceans policy into a National Action Plan	Joeli Veitayaki
12:45pm	Summary of morning session	Joeli Veitayaki
1:00pm	LUNCH	

2:00pm	Development of a coral reef action plan for Tuvalu	Group discussions
4:00pm	Synopsis of issues and discussions, together with afternoon tea	Joeli Veitayaki (Facilitator)
5:00pm	Round-up discussions	Joeli Veitayaki (Facilitator)
5:30pm	CLOSE OF DAY 1	
6:00pm	COCKTAIL (Blue Ocean)	

### Participant List

- 1 Fakasao Tofinga, NAPA Project, Ministry of Natural Resources & Environment (MNRE)  
[maneapa@yahoo.com](mailto:maneapa@yahoo.com)
- 2 Niuatui Niuatui, MDG Project  
[nniuatui@gov.tv](mailto:nniuatui@gov.tv)
- 3 Telaulini Niuatui, Media Tuvalu  
[lniuatui@gov.tv](mailto:lniuatui@gov.tv)
- 4 Semese Alefaio, Civil Society  
[semaalefaio@gmail.com](mailto:semaalefaio@gmail.com)
- 5 Maike Kitioua, Personnel and Training, Ministry of Natural Resources and Environment  
[mktiona@yahoo.com](mailto:mktiona@yahoo.com)
- 6 Nakala Nia, NAPA Project, Ministry of Natural Resources and Environment  
[naknia@gmail.com](mailto:naknia@gmail.com)
- 7 Moeo Finauga, Fisheries Department  
[mfinauga@gov.tv](mailto:mfinauga@gov.tv)
- 8 Pisi Seleganiu, Public Works  
[selaganiu70@gmail.com](mailto:selaganiu70@gmail.com)
- 9 Litia Mawi, UN Joint Presence  
[litia.mawi@undp.org](mailto:litia.mawi@undp.org)
- 10 Susan Tupulaga, Waste Management  
[stupulaga@gov.tv](mailto:stupulaga@gov.tv)
- 11 Mataio Tekinene, Ministry of Natural Resources and Environment  
[mataiotekinene@yahoo.com](mailto:mataiotekinene@yahoo.com)
- 12 Loia Tausi, PACC Project, MNRE  
[loia\\_tausi@yahoo.com](mailto:loia_tausi@yahoo.com)
- 13 Molipi Tausi, Department of Energy  
[mtausi@yahoo.com](mailto:mtausi@yahoo.com)
- 14 Lutelu Faavae, Foreign Affairs  
[lfaavae@yahoo.com](mailto:lfaavae@yahoo.com)
- 15 Tupulaga Poulasi, Fisheries Department  
[tpoulasi@gov.tv](mailto:tpoulasi@gov.tv)
- 16 Ampelosa Tehulu, Director, Public Works  
[ampextehulu@yahoo.com](mailto:ampextehulu@yahoo.com)
- 17 Taukiei Kitara, GEF Small Grants Prog. UNDP  
[taukiei@gmail.com](mailto:taukiei@gmail.com)
- 18 Kilisi Salanoa, Conservation Officer, Funafuti Town Council  
[kilisisln@gmail.com](mailto:kilisisln@gmail.com)
- 19 Andrew Ionatana, Funafuti Town Council  
[adrewionatana@gmail.com](mailto:adrewionatana@gmail.com)
- 20 Temate Melitiana, Ministry of Finance  
[tmelitiana@gov.tv](mailto:tmelitiana@gov.tv)
- 21 Elisaia Ioane, Ministry of Education  
[leleti\\_kioa@yahoo.com](mailto:leleti_kioa@yahoo.com)
- 22 Salemona Tanielu, Second National Communications Project, MNRE  
[sncproject@gmail.com](mailto:sncproject@gmail.com)
- 23 Silafaga Lahia, Tuvalu Media  
[silafong@hotmail.com](mailto:silafong@hotmail.com)
- 24 Melton Tauetia, Ministry of Natural Resources and Environment  
[tauetia@gmail.com](mailto:tauetia@gmail.com)

## APPENDIX 2

### GLOBAL CHANGES AND CAPACITY BUILDING IN CORAL REEF MANAGEMENT IN THE PACIFIC: ENGAGING SCIENTISTS AND POLICY MAKERS IN FIJI, TONGA, SAMOA AND TUVALU.

#### Progress Report on the recommendations from the workshops

held between June 9<sup>th</sup> – August 18<sup>th</sup> 2010

In April 2011, Joeli Veitayaki (School of Marine Studies), Robin South (Institute of Marine Resources) and Cherie Morris (Institute of Marine Resources) re-visited the key stakeholders in Fiji, Tonga, Samoa and Tuvalu to assess the progress on the recommended actions made during the June-August 2010 country workshops.

A summary of the recommendations under the four themes, based on gaps in coastal legislation and policy, are outlined below.

#### KEY



Recommendations from Country dossier



Additional comments from workshops



Update on implementation of recommendations made at the workshop a year later

## FIJI

### FISHERIES

#### Summary

National data on subsistence (and artisanal) fisheries is fragmented. The Fisheries Department realizes that there is a lack of capacity to carry out monitoring and data analysis and it is their intention to engage partners to assist.

The enforcement process has been improved upon in the new legislation, the Inshore Fisheries Decree which is due to be enacted in 2011. It is the intention of the Fisheries Department to review the conditions of fishing licenses in 2012.

Community leadership can be strengthened through the “Inshore Fisheries” thematic area in the Implementation Framework 2010-2014 for the NBSAP 2007 which addresses strengthening natural resources leadership and governance in communities.

- 1. The value of subsistence fisheries is more than half the value of commercial fisheries in Fiji, however, it remains poorly documented. The Fisheries Department should be encouraged and financially supported to continue doing marine inventory surveys and development of fisheries management plans. Fisheries management plans should be given formal recognition to improve management of the subsistence fisheries.**



Statistics versus inventory surveys – a portion of the funds allocated for the inventory surveys by the government departments needs to be directed towards statistical analyses of the results obtained from the surveys in order to draw substantial conclusions.

Since 2002, with the allocated funds and manpower available, 103 i qoliqoli (fishing grounds) have been surveyed by the Fisheries research officers. Fish data is stored in PASGEAR 2 which is a customised data base package primarily intended for experimental or artisanal fishery data. It is a tool that neatly and quickly lets you store and analyzes fishery data from various survey designs. The information gathered from the fish data is total annual catch per qoliqoli and per capita consumption. No other statistical analyses have been carried out. There is a lack of capacity in the Fisheries Department to carry out monitoring and data analysis and it is the intention of the Fisheries Department to engage partners such as the University of the South Pacific to assist in this area.

**2. Greater use of market surveys of subsistence catches should be encouraged.**

Surveys on subsistence catches are being conducted in collaboration with the Fiji Locally Marine Managed Area Network (FLAMMA). Catch per Unit Effort booklets have been distributed to 30 FLAMMA sites for fishers to record their daily catch and to determine the total allowable catch per species.

**3. There is a need for more scientific (ecology, reproductive biology, habitat preference) studies are carried out on the species caught for subsistence fisheries. All species important to Fiji's subsistence fisheries should be researched on.**

There is a need for more information and research on fisheries.

The University of the South Pacific has offered to assist the Fisheries Department with this by providing a collection of scientific reports on fisheries surveys carried out by other organizations/agencies in Fiji.

**4. The consequences of the loopholes in the regulations and the potential impacts they have on stocks and endangered species should be considered.**

A regular census of the subsistence catch by locals is needed. (Note: The Fiji Locally Marine Managed Areas (FLAMMA) Network has been conducting studies related to catch per unit effort regularly in their sites).

Better enforcement – all fishermen to have a fishing license (fishing license to be made affordable, hence subsistence fishermen could easily obtain one); identification tags; de-merit system for non compliance; on-spot fines; higher fines and designated areas for fish sales.

Empower fish wardens through incentives.

The final consultation for the Inshore Decree will take place around June/July 2011. Recommendations from this consultation will go to the Permanent Secretary for

Fisheries and Forestry for endorsement. The enforcement process is included in this new legislature. The Aquaculture and the Offshore Decrees have been completed and are now with the Solicitor General. From the Solicitor General, these go to cabinet for approval.

It is the intention of the Fisheries Department to assess the conditions of fishing licenses in 2012.

The Fisheries Department has identified a need for staff training for better enforcement.

## **5. Reduce fisheries effort to levels determined by science.**

The weight of evidence suggests that food fish in Fiji are in a state of near collapse.

The NBSAP process to consider recommendations from this workshop on inshore fisheries and MMAs for possible inclusion in their work/strategic plans.

To do further studies on coral reef resilience.

Enforcement issues need to be addressed, for instance obtaining licenses.

### ***Additional Recommendations:***

- i. Identify information needs to allow fisheries management.
- ii. Spatial management
- iii. Export limits (high-value products).
- iv. Aquaculture for protein (safe and feasible).

Fisheries scientific data collection is addressed in different parts of Fiji by NGO's such as Worldwide Fund for Nature, Wildlife Conservation Society, Foundation for the People's of the South Pacific, Fiji Locally Managed Marine Area Network.

## **MARINE MANAGED AREAS**

### **Summary**

The Fiji National Protected Area Committee which was established in 2008 under the Environment Management Act 2005 is addressing the legal basis of MMA's, the identification of biodiversity hotspots and the identification of a marine World Heritage site. The Fiji national Protected Area Committee (PAC) acts as a technical advisory arm to the National Environment Council to advance Fiji's commitments under the Convention on Biological Diversity (CBD)'s Programme of Work on Protected Areas (PoWPA). To date, the PAC has: established national targets for conservation and management; collated existing and new data on species and habitats; identified current protected area boundaries; and determined how much of Fiji's biodiversity is currently protected through terrestrial and marine gap analyses.

According to Jupiter et al (2011), certain provinces e.g. Lau have already expressed interest in establishing Open Ocean protected areas outside fishing ground boundaries which

provides an opportunity to work with the Fisheries Department to declare offshore protected areas.

1. Fiji has more marine managed areas (MMA) than any other Pacific Island Country and this number has increased largely since the establishment of the FLMMA network, however these MMAs do not have any legal basis nor does the status of fish wardens.

New fisheries legislation needs to allow for a simple system to have a legal basis. (IUCN/USP produced a report on approach to LMMAs having legal status and role of fish wardens).

The Protected Area Committee has engaged the Fiji Environmental Law Association for assistance with drafting protected area legislation (NBSAP Implementation Framework 2010-2014 for the National Biodiversity Strategy and Action Plan 2007).

2. The Marine Managed Area (MMA) network needs to be reinforced through an examination of connectivity, scientific inventories, physical and human resources.

Fiji MMA group meeting (2007 and 2009) has identified the need for scientific research needed in MMA establishment. Especially important are the effects of periodic openings of MMAs.

Scientific inventories should follow accepted international protocols.

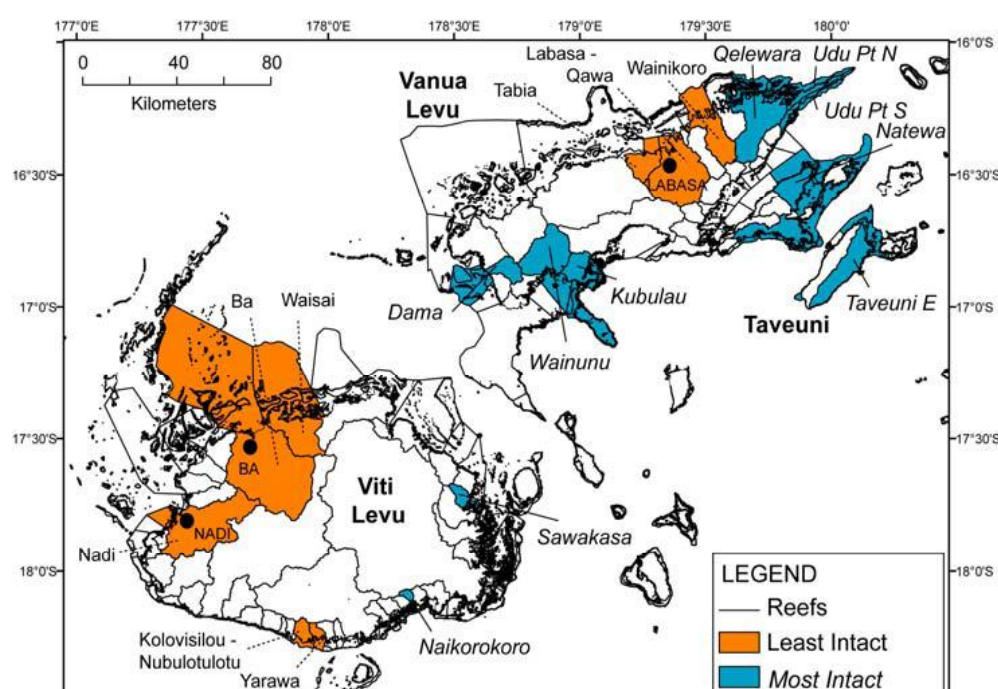


Figure 1. Mapping units (merged catchments with adjacent fishing grounds) that had the most intact (blue, solid line) and least intact (orange, dashed line) connectivity between terrestrial, freshwater, estuarine and marine areas on the main islands of Fiji. (Adapted from Jenkins et al. 2010).

Existing MMA network research is looking at the living range of certain species, catch per unit effort, satellite mapping of habitats and some work on the effects of opening of the MMAs. CI/FLMMA studies involve the genetic connectivity of fish (6 species).

Community approach – research topics need to respond to the needs of the communities.

Alternative livelihood – value-added products, handicraft, fee for sight-seeing in MMAs. Aquaculture could be another livelihood; however, good management of MMAs could yield higher profit than operating an aquaculture facility.

Causes of threats related MMAs: lack of awareness, lack of money.

A study by Jenkins *et al* (2010) identified areas with high potential of habitat connectivity between terrestrial, freshwater and marine systems as depicted in Figure 1 (Jupiter *et al* 2011).

**3. There is a need to follow up work carried out on identification of biodiversity hotspots for Fiji. We strongly support the work of the NBSAP technical working groups.**

There is a need for agreed criteria to determine the hotspots. National Environment Council has a sub-committee looking at protected areas – PoWPA (Program of Work for Protected Areas). One of the major issues in developing the criteria to determine the hotspots is the proposal of conflicting criteria by NGOs.

In September 2010, administrators from Fiji's 14 provinces attended a workshop facilitated by the Protected Areas Committee to describe the progress under PoWPA. The main goal of the workshop was to identify candidate sites for protection and management within each province which could simultaneously satisfy national and provincial biodiversity conservation and resource management objectives. The provincial administrators, with the assistance of government and non-government (NGO) participants, identified a range of sites for protection under the following general categories: Nature Reserves; Forest Reserves; Water Catchment Areas; Habitat/Species Management Areas; Conservation Areas; Community Forest Parks; Conservation Corridors/ Sustainable Use Areas; Cultural/Heritage Areas; No-take Marine Reserves; Tabu Areas (fisheries closure subject to periodic harvest); and Managed Marine Areas. Not all of the proposed categories neatly fit into the International Union for Conservation of Nature (IUCN)'s six tiered definitions of protected areas. Therefore, one of the main tasks for the PAC in 2011 will be to reconcile the different classification systems and determine the most appropriate scheme for Fiji. The ultimate aim is to use the recommendations emerging from the workshop as a basis to develop a representative protected area network situated within a broader ecosystem-based management (EBM) framework (Jupiter *et al*, 2011).

**4. Fiji should pursue the possibility of identifying a marine area to be designated as a World Heritage Site.**

This will be recommended by the PoWPA. Consider having biologically diverse sites to make up the World Heritage site. Instead of focusing on micro sites for the World Heritage Site, the whole of Fiji Islands could be declared a World Heritage Site.

Processes identified in the Implementation Framework 2010-2014 for the National Biodiversity Strategy and Action Plan (NBSAP) 2007, have allowed for the identification of sites of national and global importance for protection which may lead to the designation of a world heritage site in the future (NBSAP Implementation Framework 2010-2014 for the National Biodiversity Strategy and Action Plan 2007).

**5. Government to provide support for MMAs and to declare MMA in Fiji's Exclusive Economic Zone (EEZ).**

This issue can be related to 3, above; government supports MMAs. There is a need to identify deep sea areas within the EEZ as MMAs.

There is a need to set criteria to identify the deep sea sites.

According to Jupiter *et al* (2011), certain provinces e.g. Lau have already expressed interest in establishing Open Ocean protected areas outside fishing ground boundaries which provides an opportunity to work with the Fisheries Department to declare offshore protected areas.

**6. Strengthen community leadership.**

Leadership training needs to be conducted; Institute of Applied Science at the University of the South Pacific/Fijian Affairs Board has a joint leadership program in Cakaudrove, Macuata. The government has stopped supporting this project as of 2010; a continued support by the government is required.

The "Inshore Fisheries" thematic area in the Implementation Framework 2010-2014 for the NBSAP 2007 addresses strengthening natural resources leadership and governance in communities.

***Additional Recommendations:***

- i. Importance of improved mechanisms for compliance and enforcement.
- ii. Awareness and education – schools, communities. Lack of awareness and income (economic drivers) are root cause of poor MMAs.
- iii. More economic studies on the value of biodiversity, ecosystem services and MMAs.

***Additional Comments:***

MMAs provide an immediate solution whilst long time long term causes can be tackled later and it is now time to act.

Best practice can be based on future research.

The NBSAP process to consider recommendations from this workshop on inshore fisheries and MMAs for possible inclusion in their work/strategic plans.

To do further studies on coral reef resilience.

Education on marine environment issues at village level and above.

Need for leadership and accountability for coastal zone management; mangrove management etc.

Paper from Integrated Coastal Management Committee and Fisheries to the National Environment Council for leadership direction for mangrove management.

Establishment of a National Committee on inshore fisheries. (Is FLMMA Executive Committee appropriate?)

A framework for an Integrated Coastal Management Plan which includes a Mangrove Management Plan is currently being developed by the Department of Environment in collaboration with partners.

## GLOBAL CHANGE

### Summary

The sectors identified in the draft Fiji Climate Change Policy as being most vulnerable to climate change are, (i) agriculture, (ii) coastal zone, (iii) public health and (iv) water resources. The above sectors are therefore the foci for adaptation at the national and local levels. This project focused on rural communities with emphasis on coastal areas and water resources, which are vulnerable to ongoing climate change and important for the livelihood of rural communities. The policy covers mainstreaming of climate change issues; to improve climate change data collection, storage and sharing; to promote awareness and understanding of climate change; to implement adaptation actions; to implement mitigation measures; and to ensure Government commitments to regional and international instruments are maintained.” Link: [http://www.fiji.gov.fj/index.php?option=com\\_content&view=article&id=1368:climate-change-policy-for-fiji&catid=71:press-releases&Itemid=155](http://www.fiji.gov.fj/index.php?option=com_content&view=article&id=1368:climate-change-policy-for-fiji&catid=71:press-releases&Itemid=155)

A community based climate change adaptation project is being implemented by the University of the South Pacific. The project’s major emphasis is on the implementation of cost effective adaptation options in water and coastal sectors in nine village communities in Fiji. The project has piloted the implementation of climate change adaptation in six rural communities within Fiji focusing on two exposure sectors (i) coastal areas (including the coastal zone - beach, coastal land - 30metres from high tide mark and its ecosystem e.g. mangroves and coral reefs), (ii) water resources utilizing a simplified V&A methodology (Link: <http://www.usp.ac.fj/index.php?id=9843>). From experience in working with communities, lessons learned encompass four main areas: community involvement is essential, support from outside groups is important, information about climate change and adaptation needs to be disseminated and shared, long-term monitoring, maintenance and evaluation is needed (5-10 years) (Aalbersberg et al, 2010). As mentioned by Limalevu, 2010, “climate change policy’s strategies, which are directly aligned with this project’s objectives, are:(i) promote soft solutions/ methods to address climate change problems through community



participation in seminars and activities like reforestation; and (ii) provide external training to improve and raise public understanding through workshops to promote community stakeholder participation.”

The University of the South Pacific has developed a series of (12) fact sheets on climate related issues and offers a course on climate change impacts and adaptation (V&A) aimed at officials, NGO workers, community leaders, etc which is now available online

Link: [http://www.usp.ac.fj/fileadmin/files/Institutes/pacesd/Projects/ClimateChange/USP\\_work\\_on\\_adaptation-v4.pdf](http://www.usp.ac.fj/fileadmin/files/Institutes/pacesd/Projects/ClimateChange/USP_work_on_adaptation-v4.pdf)

- 1. We recommend that the impact of climate change events on the coral reef fisheries should be monitored and assessed, for instance, bleaching events, quantification of ocean acidification and sea-level rise.**

Monitoring and assessments are important: “You cannot manage what you do not measure”.

Existing groups and systems: GCRMN, Reef Check, LMMA, Tide gauges.

Strengthen and enhance existing efforts.

Utilize satellite derived data/ global and regional model data.

- Establishing Fiji monitoring station (for example multi parameter monitoring buoy)  
– too expensive.

Scientific findings to be translated into easily understood language.

Use networks: SPREP (PI-GOOS – Pacific Islands Global Ocean Observing System), SOPAC (SPSLMP – South Pacific Sea Level and Climate Monitoring Project).

Monitoring is happening, but is not coordinated or communicated effectively.

- 2. There is a need for more community awareness on potential impacts of climate change on fisheries such as increasing sea surface temperatures, coastal inundation, ocean acidification, and sea level rise.**

Need for awareness material

Create pamphlets and posters in local language

School curriculum

Translate global change into national action

Climate change adaptation following known best practices for existing environmental problems.

Need real commitment to adapt to climate variability; will improve our capacity to adapt to future climate change effects.

A community based climate change adaptation project is implemented by the USP. The project's major emphasis is on the implementation of cost effective adaptation options in water and coastal sectors in nine village communities in Fiji. The project has piloted the implementation of climate change adaptation in six rural communities within Fiji focusing on two exposure sectors (i) coastal areas (including the coastal zone - beach, coastal land – 30 metres from high tide mark and its ecosystem e.g. mangroves and coral reefs), (ii) water resources utilizing a simplified Vulnerability and Adaptation (V&A) methodology. Major outcomes were: enhanced understanding of climate change impacts and adaptation through community level planning and capacity building and improved resilience of target communities to impacts of climate variability and climate change.

## MULTI-SECTORAL, MULTI-STAKEHOLDER CONSULTATIONS

### Summary

Initiatives taken by the Department of Environment (DOE) that will allow for wider consultation among relevant departments and stakeholders with respect to coastal development include: the establishment of a national clearing house mechanism for biodiversity data in order to facilitate scientific and technical cooperation, knowledge sharing and information exchange between stakeholders/partners; the development of a Natural Resource Inventory (NRI) which provides baseline information on all resources available including marine. This information should assist the different government departments in planning and monitoring the development and utilization of these assets that are of interest to their core role.

- 1. We recommend that there be wider consultation among relevant government departments and stakeholders with respect to coastal development.**
- 2. There should be a national integrated coastal zone management plan for Fiji. We support the work of the ICM committee currently working on this.**
- 3. Integration must be strengthened.**

Supported and already addressed by the Integrated Coastal sub-committee under NEC.

Clarify and simplify departmental procedures and responsibilities.

Further commitment by industries to be involved in maintenance of a healthy ecosystem.

Application of precautionary principles and best practices in coastal communities and development.

Set a minimum standard for best practice for waste management, agricultural land use.

Encourage sectoral linkages

Invasive species such as *Sargassum* that is now dominating some parts of the country.



Develop industrial use for hazardous (invasive) species such as *Sargassum* and *Gracilaria*.

Have a process for equitably sharing benefits from genetic use of marine resources.

Capacity building needs in Ministries.

Need to develop a system of collecting, collating and disseminating statistical information on subsistence and [commercial] fisheries important and useful for management.

Recognize the linkage between management, industries and research.

Tertiary student researches to be identified in terms of industrial and government research needs.

The establishment of Environment Management Units in key sectoral agencies has begun in order to facilitate integration and sectoral linkages. Through this system, it is envisaged that national guidelines for inter-sectoral coastal development will be strengthened.

## SAMOA

### FISHERIES

#### Summary

The Fisheries Division is addressing the gaps in fisheries data collection, biodiversity research, threat management and fisheries development and management through their corporate plan 2010-2011. various activities such as, further collection and documentation of the inshore fisheries biodiversity collection; developing and managing food security; identifying threats to fisheries; developing effective fisheries monitoring systems (to ensure sustainable utilization and management; improving effective management of aggregate spawning species; awareness raising; wide consultations for the coastal fisheries development plan; enhancing capacity of fisheries staff and stakeholders.

- 1. There is a need to more accurately document the catch from all sectors, so that the full contribution of fisheries to the national GDP can be assessed.**

Government recognizes the need to improve compatibility of fisheries data gathered by different agencies, and use of a uniform standard sampling method among agencies.

The Central Bank of Samoa reports separately from MAF in fisheries catch. There is a need to have a uniform / standardized sampling method between MAF and CBS. This is critical so that all are operating on the same database!

Subsistence fishers could be issued with licenses to more accurately record catch.

- 2. Regulation of the fishery has not prevented the continued use of destructive fishing methods (e.g. Derris). There is a need for education of fishers on the consequences of these practices.**

Start with the schools on awareness; increase the fines on culprits e.g. derris and dynamite. There should be a law to protect "whistle blowers" who report on destructive fishing.

- 3. There is a strong need for increased research on the marine biodiversity of Samoa: it's hard to manage it if you don't know what you are managing.**

Agreed. Take up undergraduate students (including exchange programmes with other universities) to assist scientists and researchers.

Fish and coral specimens are held by Fisheries Division. Collection and documentation of marine organisms is on-going.

- 4. Research is needed on the valuation of Samoa's reefs and reef resources, as this information is vital to decision-makers.**

Yes a valuation assessment is needed! Funding will be required for this.

- 5. Sites that are especially vulnerable to threats need to be identified.**

There is existing collaboration between various departments on these issues. Samoa plans to develop a National Ocean Policy, and has welcomed the assistance of USP in this process.

- 6. The apparent shift from subsistence to artisanal fishing could have significant socio-economic consequences, and needs to be carefully assessed.**

There is a need to carefully assess the data on subsistence fishing, and to check whether they are really small scale or commercial. Regulations are in place to control fisheries and promote alternative livelihood generation e.g. aquaculture.

- 7. Damage to critical sites (such as the five-mile reef) is impacting on biodiversity, tourism and the fishery and measures need to be put in place to try and reduce this as far as possible.**

There is a draft management plan for 5-mile reef, but it needs to be discussed in detail among the agencies responsible for improvement. There are alternative anchoring sites outside the harbour, so anchoring at 5-mile reef is not essential.

- 8. The impacts of invasive marine species on Samoa's reefs and resources should continue to be assessed.**

MNRE should keep up the good work of assessing species, although staff-shortages are an issue. The inclusion of MPAs in the invasive species assessment programme should be considered. Involvement of SPREP, NUS and other consultants should be considered.

Currently, the Fisheries Division is focusing on developing marine biodiversity; developing and managing fisheries food supply systems; effective management of fisheries related risks and hazards; formulation and implementation of fisheries management plans; strengthening extension outreach and information services; enhancing staff capacity.

## MARINE MANAGED AREAS

### Summary

Activities for marine managed areas are focused on establishing additional areas, extending existing areas (e.g. Palolo Deep Marine Reserve), the continuation of monitoring and research, review of management plans and improving data dissemination.

- 1. Do the village fisheries management areas fit into any of the IUCN MMA categories? If not, how should they be regarded in terms of Samoa's obligations under the WSSD requirement to have up to 30% of the coastline protected by 2012?**

Essentially the village fisheries management areas could be designated as MPAs, and this is under consideration. It's not so relevant that they fit into any one of the IUCN's MMA categories. It would mean that Samoa would be close to meeting its obligations under WSSD. There are government-assisted UNDP-funded village projects to establish new MPAs under the Ministry of Natural resources and Environment.

Establish more MPA's/fisheries reserves to meet WSSD target.

**2. There was a plan in place to extend the Palolo Deep Marine Reserve (PDMR) along the entire Apia waterfront – this plan should be revived if possible?**

This idea has been discussed in the past, but there are no plans to follow through on this because of the complexities (legal, ownership, multiple use, etc.).

Extend PDMR towards the east (feasible & because of the many problems within the harbour/waterfront) if the plan goes ahead;

Resolve issues pertaining to land ownership;

Continue monitoring assessments to determine status of marine biodiversity in existing area;

Conduct sound research and baseline assessment of the proposed area.

**3. Do the village fisheries reserves serve as MMA's or is there a need for Samoa to identify other areas for full conservation (e.g. Manono Island)?**

See 1 (above). There is a need to carry out research on land-based activities.

Encourage Guidelines according to Samoan context for eco-tourism activities within MPAs/fisheries reserves; network with the tourism sector.

Extend MPA/Fisheries Reserve coverage to uninhabited and isolated islands, KBAs and Government Land e.g. Nuusafe'e, Nuulopa, etc.

Encourage the management and sustaining of the current fisheries reserves;

Improve and/or continue with MPA awareness and education (including official inclusion of Marine in curriculum)

Need to carry out research on land-based activities

Encourage Guidelines according to Samoan context for eco-tourism activities within MPA's/fisheries reserves; network with the tourism sector.

**4. There is a need to obtain empirical data on the impacts of the village fisheries management plans; i.e. there is a need for more scientific research.**

This was reported on in 2006. There is a need to carry out a detailed socio-economic study of the VFMP programme. USP has been requested and is willing to assist government in fund-raising for this. The reserves are regularly monitored, and data are shared with stakeholders.

Continue with scientific research and assessment of MPA's/fisheries reserves conservation values;

Update and improve data sharing among stakeholders;

Consistent review of Management Plans based on findings of assessments;

Strengthen stakeholder partnerships including community participation.

## GLOBAL CHANGE

### Summary

The Ministry of Natural Resources and Environment (MNRE) is taking the lead to build capacity in mainstreaming to integrate climate change into all programmes such as; water, land and coastal resources, forestry, biodiversity, chemicals management, parks and reserves, disaster management, waste, sanitation, sustainable development and mitigation within the areas of renewable energy. The MNRE is promoting collaboration among regional centers and networks for better support of Parties to the UNFCCC in assessing the impacts of climate change, making informed adaptation plans and enhancing the capacity for implementing National Adaptation Programmes of Action (NAPAs).

The draft State of the Environment report of 2006 was reviewed in 2010 to update it by including environmental changes and identifying gaps to be addressed in the final report.

1. **There is a need to measure sea-level rise *vis-à-vis* the “bounce” effects of geological events in the Samoa archipelago (e.g. how do you compare SL rise with these geological events)?**

Samoa maintains a tide gauge at the Apia wharf. At present there is no means whereby tidal data can be compared with the results of seismic events, uplifting, etc.

2. **The Aleipata and Safata MPAs (jointly managed by Government and the communities) were badly impacted by the 2009 tsunami – is there an adequate V&A plan in place to deal with this and future such events?**

Vulnerability and Adaptation assessments have already been carried out for most the sites – existing documents should be reviewed. Take into consideration the Disaster Risk Emergency Response Plan, and those in NAPA and any other national plan.

There is a need to develop a bleaching response plan, and a need to identify temperature tolerant corals and coral reef areas, to improve reef resilience through best management practices, land-based pollution control and coastal development. *Ad hoc* arrangements are in place between MNRE and MAFF where these issues are discussed.

Samoa is currently co-chair (with Monaco) of the International Coral Reef Initiative (ICRI) and hosted the last ICRI meeting in Samoa in 2010. It will relinquish the co-chairmanship in November 2011 at the forthcoming ICRI meetings in Réunion. The

development of a national Coral Reef Management Plan is under development and Samoa is also requesting USP assistance on this.

V&A assessments have already been carried out for most the sites – existing documents should be reviewed. Take into consideration the Disaster Risk Emergency Response Plan, and those in NAPA and any other national plan.

Need to develop a bleaching response plan.

Take the V&A report to all areas, not just Aleipata.

Need to identify temperature tolerant corals and coral reef areas.

Need to improve reef resilience through best management practices, land-based pollution and coastal development

Need for education and awareness programmes; assessment of the impacts of seawalls, etc. Ensure that sea-walls are properly designed with engineering input.

Need to enhance Samoa's political commitment to reduce green house gases in Samoa.

Need for a comprehensive sea level assessment – the assist with future planning. Include examination of the impacts of the rising of the plates.

Increase collaboration with other agencies such as coral reef advisory groups

Highlight community involvement e.g. for indigenous knowledge, collaboration with tourism, private sector.

Recording stories of all the changes on the reef – pictures, stories, etc.

## MULTI SECTORAL MULTI STAKEHOLDER CONSULTATIONS

### Summary

Multi-sectoral environmental issues are addressed through the MNRE's programmes and projects under various divisions including forestry, land management, meteorology, water resources, planning and urban management, environment and conservation.

- 1. Waste disposal is a major national issue and despite the best of effort, members of the public are still dumping waste inappropriately. There is a need for a strong national campaign towards environmentally responsible waste management.**

There have been many improvements in waste management, and these are on-going and monitored by MNRE. Waste collection is carried out on a twice-weekly basis in Apia, as well as in surrounding communities. The waste disposal site is inland, and therefore does not impact on the coastal environment. Other improvements include the recent introduction of a new sewage system for Apia. Recycling is happening – often with the help of recyclers in Fiji. An incineration facility has been built at the public landfill. Locally made plastics are now biodegradable.

**2. Improved communication between responsible government agencies is needed in areas such as coastal development, tourism, etc.**

There have been many improvements in this area. The marine environment and coral reef management should be mainstreamed in the Sector Plans.

**National Environmental Issues:**

Marine Protected Areas; multi resource agencies; regulation enforcement; information dissemination to the public; sand mining; land erosion – sedimentation; coral reef destruction; land use regulation; pollution; re-cycling (e.g. new products like diet coke in bottles; population pressure.

**Recommendations:**

Increase monitoring; information sharing; resource sharing; monitoring research/management (follow-ups); more collaboration needed at all levels; increase public awareness; create common working group; enhance good governance; local level ownership of information; seek skills/knowledge on issues; seeking partnerships; two Samoa's initiative.

Multi-stakeholder consultations are addressed through the implementation of various national policies under the MNRE. In addition, the state of the environment report is being finalized by the MNRE.

## TONGA

### FISHERIES

#### Summary

Gaps in species conservation, marine biodiversity information, decline in coastal fisheries and improved enforcement of fisheries legislation are being addressed by the Fisheries Division and partners through programmes/projects including the National Biodiversity Strategy Action Plan (NBSAP).

1. **Tonga fisheries should consider the possibility of imposing a turtle moratorium (such as in Fiji).**

There is no need for a turtle moratorium, as Tonga fisheries has now put in place new management measures to regulate turtle stock, such as size limit, season for harvesting, prohibitions on harvesting of females, nesting females and eggs. A turtle tagging programme is in place to determine movements of turtles.

There is a total ban on Leatherback turtle harvest and a closed season for the rest of species for the harvest of male turtles from August to February. Fisheries staff inspects all harvested turtles before slaughter. All known turtle nesting sites are managed.

Enforcement is more effective around the main center and the SMA concept enhances the community involvement of resource management in outer islands e.g. Ha'apai.

2. **There is a need to obtain more comprehensive information on the biodiversity of Tonga's reefs with the necessary scientific input.**

There is a recent report on Tonga's Biodiversity produced by the Ministry of Environment and Climate Change (MECC); it was suggested that the numbers of species reported are probably much larger than given in the report (e.g. 200 species of fishes for Tonga compared with ca. 1,000 for Samoa). It was agreed that resources are needed for the conduct of scientific research on biodiversity.

Activities under the eight thematic areas of the National Biodiversity Strategy and Action Plan (NBSAP) have been 70-90% completed. Thematic areas include, forest ecosystems, marine ecosystems, species conservation, agro-biodiversity, local communities and civil society, access and benefit sharing of genetic resources, biodiversity conservation, financial resources and mechanisms.

An integrated biodiversity project is due to start in June 2011 to establish new marine areas funded by United Nations Environment Programme (UNEP) through the South Pacific Regional Environment Programme (SPREP) in Samoa.

A resource inventory report was done in 2004 where gaps were identified and a work-plan set up to address these accordingly.



More research is needed to have a better understanding of biodiversity and making this information available through education and media.

**3. There is need for a plan to address the sharp decline in coastal fisheries.**

This is addressed in the existing fisheries management Plan. The implementation of this plan should be encouraged rather than developing a new plan.

Strategies implemented by the Fisheries Division to address this issue include the set up of community-based special management areas (SMAs) and fish aggregating devices (FADs) in coastal areas, and a closed season for mullet. In addition, there has been a reduction in the number of aquarium export companies from 5 to 2.

The Civil Society Forum of Tonga continues to implement projects that address the conservation of coastal ecosystems such as mangrove re-planting and rehabilitation which allow for the enhancement of fisheries and biodiversity

**4. There is a need for improved enforcement of the Fisheries Management Act.**

Agreed, but at the same time the capacity and resources of the enforcing department should be taken into consideration. New fishery regulations have been gazette. It was agreed that communities should be encouraged to use a community-based approach to assist in enforcement and conservation efforts. Stakeholder involvement should also be encouraged, including public awareness and education.

The devolution of enforcement authority was proposed, together with improvement of enforcement (need resources like boats, fuel, hefty fines). Enforcement should be made a money-generating activity and communities should get something out of enforcement income.

Enforcement remains a challenge; however, community involvement has enabled greater enforcement capacity e.g. Illegal fishers in Atata SMA have been prosecuted and fines go towards government revenue.

Better strategies for enforcement are needed due to the reduction in numbers of Fisheries staff and increasing operating costs so communities and other stakeholder involvement is extremely important for enforcement.

## **MARINE MANAGED AREAS**

### **Summary**

Marine managed areas are used for different conservation purposes by the Ministry of Environment and Climate Change and the Fisheries Division which is the reason for different names. However, both agencies use physical markers.

**1. There should be a clear definition of what is meant by the various categories of marine parks, reserves, special management areas and marine protected areas.**

Agreed, but this is clear at National level. But need to clarify boundaries of MPAs and SMAs. Physical markers, list of names of reserves. Parks, reserves and MPAs are no take, and SMAs are for multi-purpose. Need to correlate definitions with international definitions.

#### **Notes on the Parks and Reserves Act (MECC):**

All terrestrial and marine Parks and Reserves in the Kit are designated under the Parks and Reserves Act 1979 (1988). For marine parks and reserves, coastal areas (Ha'atafu) are allocated as 'Beach Reserves', reefs fringing islands that are protected areas (Monuafe & Malinoa) are allocated as 'Island Park and Reef Reserves', and other reefs (Hakaumama'o & Pangaimotu) are allocated as 'Reef Reserves'. All marine parks and reserves are designated as 'No-take' Marine Protected Areas (MPA). 'Mounu Reef Reserve' has been named but is not yet designated under the Parks and Reserves Act, when it is it will be an MPA. Fanga'uta Lagoon Reserve is designated under the Birds and Fish Preservation Act 1988 and is multi-use, not under the MPA category.

#### **SMAs Fisheries Management Act**

All Special Management Areas are designated under the Fisheries Management Act 2002. They are only labeled with the name of the adjacent community (Ovaka, and are 'multi-use' areas including 'no-take' and fishing zones.

#### **Additional Recommendations:**

1. There is a need to clarify boundaries for MPAs (work with Ministry of Transport to address shipping issues). Place physical markers and change coordinates in legislation.
2. Designate new protected areas (propose to include Niuas Island Group).
3. Need to put in place Enforcement officer as per requirements of the parks and reserves act, however need to review job description of the Officer. Possibility of police support during enforcement.
4. Public awareness by government departments (DoF, MECC, Tourism etc) and NGOs (Civil service, Tonga Trust, VEPA etc). Incorporate into school curriculum. Main focus on marine resource users e.g. fishers
5. Develop better scientific monitoring methods
6. Should have a long term monitoring and also have a disaster response plan
7. Enforce legislation and amend old boundaries, designate new boundaries, as well as reviewing enforcement officer roles and responsibilities.
8. Stakeholder consultations (Ministry of Transport, Tourism, MECC, DoF, NGOs)
9. Look for funding options: Collaborate on cross-ministry funding, e.g. NOAA application.

The term Marine Protected Areas (MPAs) is used by the Ministry of Environment and Climate Change mainly for biodiversity conservation, whereas Special Management Areas (SMAs) is used by the Department of Fisheries for a variety of purposes including the enhancement of fisheries, conservation, biodiversity and a partnership with communities.

## GLOBAL CHANGE

### Summary

Tonga has made good progress on the Millennium Development Goals and has completed the second report. Although the Ministry of Environment and Climate Change (MECC) have not yet established their clearing house mechanism, it has established a database containing all the reports which have been written on climate change issues.

Tonga has made significant progress with regards to addressing climate change issues pertaining to its obligations under the United Nations Framework Convention on Climate Change (UNFCCC) through development of national policies, legislation and action plans.

**1. We recommend that progress on Millennium Development Goals (MDGs) be discussed.**

- G2 of MDG: Applicable to Tonga. Achieve universal primary education. Need for awareness at primary school level, and also need to ensure that all kids go to school.
- MECC is in the process of finalizing its 2<sup>nd</sup> report to MDG end of this month. To be finalized and presented to cabinet.
- G7 of MDG: ensure environmental sustainability: a) Promote ecosystem-based adaptation to climate change in Tonga; b) identify vulnerable ecosystems through surveys and on-going monitoring; c) capacity building: community involvement needed, including incorporation of traditional knowledge.
- G8: Develop global partnerships for development; develop project proposals to address vulnerable areas; manage existing projects and ensure objectives are met; learning from Pacific neighbors to assist Tonga to move forward; develop MDGs specific to Tonga.

The second report on the MDGs has been finalized and approved by cabinet. The report was officially launched on 19<sup>th</sup> January, 2011.

**2. We recommend the establishment of a clearing house for climate change information and exchange.**

It was proposed that the clearing house on climate change should be at USP; using USP as a main centre of information has the advantage that USP hosts most Pacific Island students and these data would thus be available to all Pacific Islanders.; PACE-SD already has a proposal for this to the EU funding, but the project has not yet been activated. MECC has also requested funds for a national Climate Change (CC) database. A CC database should incorporate information from government and the private sector that is accessible to the public. The idea of a central location for each island was suggested.

The climate change database held by MECC is in place. Reports now done by locals therefore it is easier to retain information as compared to reports done by expatriate consultants.

There is a need to translate awareness material to community levels of understanding. Awareness activities include written material, radio and television shows.

MECC is a member of the Parliament Standing Committee on Environment and Climate Change where advice is given to policy makers. The last presentation to this committee by MECC was done in March 2011.

Tonga like Fiji has also begun consultations on its National Climate Change Adaptation Strategy for the Climate Change Policy being developed by the Ministry of Environment and Climate Change (MECC). Other current activities of MECC include, NBSAP, inventory for biodiversity, climate change national communications including inventories of green house gases, a joint national action plan for adaptation to climate change and a partnership between the Climate Change Division (MECC) and the Disaster Risk Management (Ministry of Works), Action Plan under UNCCD Desertification, MESCAL project, National capacity self assessment (NCSA) - capacity for 3 conventions (UNFCCC, UNCCD, CBD). Tonga's Programme of Work on Protected Areas (PoWPA) is in place and a report is in process for 5 marine protected areas.

## **MULTI-SECTORAL AND MULTI-STAKEHOLDER CONSULTATION**

### **Summary**

There is a more structured form of collaboration amongst the key stakeholders although this is driven by projects with external funding.

- 1. There is a need to resolve ongoing issues regarding ownership of remote reefs (under UNCLOS).**

Yes this really needs to be resolved as soon as possible, especially for the purpose of management of reefs. The cost of management of these reefs should be acknowledged.

Negotiations are taking place between Fiji and Tonga with regards to remote reef such as Minerva Reef.

- 2. No wastewater and sewage management plan**

Agree: very significant because most sewage and waste water is flowing into the ocean. This may cause negative effects. Under the regional waste strategy (SPREP), Tonga has a waste management authority, which may have a plan.

A sanitation and waste water management plan was developed in 2008.

- 3. Are the results of the post tsunami report on Niuatoputapu available and will they be brought into wider national disaster management plans?**

Information and reports are not available; The Disaster Management Committee of the Ministry of Works may have a plan or report. A future adaptation strategy is needed to address this.

National Emergency Management Office of the Ministry of Works is responsible for all disaster related reports and the Meteorological Office monitors disaster warning.

4. **The Inter-Departmental Environment Committee (IDEC) should consider inclusion of NGO and civil society representatives on the committee.**

Agreed. It is very important to involve NGOs and civil society.

5. **Existing mechanism should be strengthened and given more support in implementing the Environment Management Plans in a coordinated manner**

MECC should work closely with DoF especially in terms of coordination, implementation and management of projects, and data sharing.

In 2010, MECC and DOF staff combined resources for a monitoring survey. In addition, staff were trained on invertebrate monitoring. There are plans for further training on coral and finfish surveys based on revision of methodologies under the SciCOFISH project with the Secretariat of the Pacific Community (SPC) and funded by the European Union.

The MECC and the DOF are responsible for whale management.

The MOT is involved in setting up a coral reef sanctuary covering the whole of Tonga and are working with SPREP and the DOF.

6. **A national marine awareness program on marine issues should be developed by all stakeholders.**

Environment and DOF should work together in carrying out national marine awareness programmes, and should include NGOs if the ministries cannot perform this task.

Yes there is a need for more awareness and more collaboration amongst stakeholders although collaboration exists on various levels.

The MOT is also included in environment project committees led by MECC.

The MOT is promoting whale watching ecotourism and is working with MECC on environment friendly practices. Whale watching tourist operators are now moving into Ha'apai and 'O'ua and the existing ones in Vava'u are also moving into these islands. People in these remote islands are conservative and concerned about Chinese businesses coming in and setting up as this could be a threat to marine resources.

Under the GEF small grants programme a partnership between the Civil Society Forum of Tonga and Fisheries, is an education and awareness component which will be implemented in 2011.

## TUVALU

### FISHERIES

#### Summary

The Department of Fisheries will be guided by the revised Fisheries Act and projects with relevant partners to address the gaps in biodiversity information, species conservation, enforcement of fisheries regulations, capacity building in fisheries monitoring and assessments and awareness raising.

In addition, the roadmap included in the institutional strengthening scoping study report produced by Tuvalu's Ministry of Natural Resources and Environment, Department of Fisheries and the Pacific Islands Forum Fisheries Agency in 2010 will allow for improved management and development of fisheries resources and livelihoods.

1. **There is a need to obtain more comprehensive information on the biodiversity of Tuvalu's reefs with the necessary scientific input.**

Agreed.

Pending funding from partners such as Alofa Tuvalu and Kaupule, the Department of Fisheries plan to conduct follow up surveys in all parts of the country. Partners need to collaborate with Fisheries instead of working in isolation.

2. Legislation to protect marine turtles needs to be put in place.

Agreed.

There is draft legislation for turtles to be part of the Fisheries Act pending approval by cabinet. Subsistence turtle consumption is allowed although current legislation prohibits taking of turtles below 70cm curved carapace width.

3. Over-fishing in heavily populated areas should be better regulated/managed

Agreed.

Locally managed marine areas are operated by communities.

Regulation by the kaupule prohibits the use of one inch mesh fishing nets as well as the kupega (modified fishing net with a pocket). By-laws in some of the islands prohibit certain fishing gear e.g spear fishing.

4. National Fisheries Laws are comprehensive, but there is a need to promulgate more regulations to conserve and manage marine resources (coastal resources).

Agreed.

This has been addressed by the recently revised Fisheries Act. Revision began in April 2010.

5. There is a need to undertake effective monitoring and assessment of coastal fisheries resources, and to develop capacities in these areas.

Agreed.

Need Awareness Programmes.

Marine Education should be incorporated into the National Curriculum.

Need to harmonize the fisheries laws, and improve enforcement. The marine Fisheries Act is more for tuna than reef resources.

Need for incentives for those who follow the laws.

The Fisheries Department is awaiting the budgetary allocation for awareness raising in some communities. Education materials continue to be produced by community based resource management groups. Alofa Tuvalu/Fisheries have planned to produce educational materials.

The revised Fisheries Act incorporates both oceanic and inshore fisheries. However, there is a need for promotional work after the Act has been passed by parliament.

Plans for institutional strengthening of the Department of Fisheries over four years from 2011 will allow improved delivery of services and contributions to building domestic fisheries within sustainable limits.

## MARINE MANAGED AREAS

### Summary

Combined efforts of non-government organizations and the Tuvalu government are addressing issues relevant to marine managed areas such as, enforcement, standard survey methodology, marine resource inventory, linkage to national strategies and community engagement.

1. **There is a need to enforce the by-laws associated with conservation areas.**

Need to review and harmonize existing by-laws and regulations

Identify issues which hinder implementation/enforcement of laws.

Intentions of the Fisheries Department are to work on national guidelines for the involvement of different stakeholders to enforce by-laws. Fisheries intend to consult with the Ministry of Home Affairs in order to harmonize the Falekaupule Act (new form of governance established for island communities in Tuvalu) with the Marine Resources Act; and to ensure that there is consistency with the new proposal from the Kaupule (executive arm of the Falekaupule) which will be endorsed by the Attorney General's office.

2. **There is a need to establish the procedures of systematic surveys for taking marine resource inventories on a regular basis to maintain a long-term data set.**

### Need to standardize monitoring methods and conduct regular surveys.

The Fisheries Department is trying to ensure that a standard methodology is used to allow for comparable data. The Island profile project (MinHA) is currently collecting data from all islands and this will contribute to the resource inventory.

3. A formal inventory of Tuvalu's marine biodiversity needs to be created and maintained.

### Develop and maintain a relevant database.

Alofa Tuvalu (AT), a non-government organization is currently working on the inventory to which the Fisheries Department will contribute.

4. The possibility of creating more MPAs, and improving the management of the existing MPA should be examined.

### Agreed with the establishment of new MPAs and share lessons learned from existing ones

### Need to harmonize the process of endorsement and establishment of MPAs

TANGO is working on a major project to establish new MPAs in the outer islands.

NAPA has allocated funds for food security to support the communities' initiative by the Kaupule.

5. There is a need to engage local communities in the selection, planning, management and enforcement of marine protected areas.

### Agreed. Need sustainable donor support for maintenance and improvement of MPAs.

Funds have been secured from the GEF small grant programme and AusAID to support communities with MPAs.

Government intends to harmonize the Conservation and the Falekaupule Acts and enforce the \$400 penalty on any infringement in conservation areas.

6. MPA activities should link to national strategies (National Strategy for Sustainable Development 2005-2015: TeKakeega II).

Tekakeega II may need to be reviewed to include MPA activities.

## GLOBAL CHANGE

### Summary

National climate change activities are currently being addressed by the National Adaptation Programme of Action (NAPA) and non-government organization projects. In addition, the upcoming National Climate Change Policy (NCCP) and Joint Climate Change Adaptation and Disaster Risk Management National Action Plan (JNAP) will compliment these activities.



1. **We recommend that the progress of the NAPA activities be reviewed and finalized and an examination of potential adaptation strategies for climate change induced threats should be undertaken.**

Under the National Adaptation Programme of Action (NAPA) community organizers are responsible for coordination of activities. The main issues are food security, water security and coastal protection.

Other activities include, habitat maps developed by the South Pacific Geoscience Commission (SOPAC) for Nukulaelae and Nukufetau islands which will assist in their coastal protection and a partnership with non-government organizations, JPACE & FORAM SANDS on beach nourishment on Funafuti.

2. The comparative impacts of over-population versus effects of climate change (e.g. sea-level rise) should be evaluated, as it appears that the former exacerbates the latter.

Agreed.

An elevation survey has been carried out at Te kavatoetoe to determine the vulnerability of saltwater intrusion and storm surges through cross sectional profiling which is determining the height of area and building relative to the mean sea level mark.

3. There seems to be a lot of environmental related projects currently being implemented in Tuvalu to combat impact of climate change and sea level rise. However, there is a need to assess and review not only the outcomes of these projects against objectives, but their implementation at national level. This is important in order to avoid duplication of efforts and ensure better use of resources.

Agreed.

4. More studies need to be carried out to assess the impacts of climate change on marine resources, fish stocks including coral reef ecosystems as well as the impacts of changes in ecosystems on fisheries.

Agreed.

NAPA has received 1m from AusAID for the following activities:

- Awareness-raising at the local level. Translate materials into local language; encourage effective awareness raising programs through art competition for primary and secondary schools. Empower NAPA community organizers are doing awareness in the outer islands
- Include climate change in the education curriculum and localize the syllabus.
- Institutional strengthening – need a National Advisory Body into which other groups (e.g. Climate Change Committee) can participate.
- Need for a survey to find out the local understanding of climate change.

Need to continue with education and awareness exercise and information and revisit to reaffirm the knowledge gaps.

In addition, in line with the Te Kakeega II and Tuvalu's National Strategy for Sustainable Development, 2005-2015, the government of Tuvalu along with partners, Secretariat of the Pacific Regional Environment Programme (SPREP) and the Secretariat of the Pacific Community (SPC) SOPAC Division developed a framework for the National Climate Change Policy (NCCP) and Joint Climate Change Adaptation and Disaster Risk Management National Action Plan (JNAP) in May 2011.

## MULTI-SECTORAL AND MULTI-STAKEHOLDER CONSULTATION

### Summary

It is clear that a more coordinated effort is needed for the development and management of the environment in particular, marine resource and waste management.

- 1. There is a need to assess the impacts of land-based activities on the coral reef resources.**

Agreed: Agriculture activities, infrastructure, reef channels.

There should be an EIA for major projects e.g. causeway cutting for sand transportation

- 2. There is a need to design and implement proper waste disposal practices and to reduce eutrophication in heavily populated areas.**

Agreed: Liquid waste – composting toilets; solid waste – recycling.

There is a need for capacity building and for greater coordination of donor agencies.

- 3. The possibility of expanding the tourism industry (e.g. eco-tourism with a low carbon footprint) should be considered – the atolls and their way of life could be a significant attraction to tourists seeking something different.**

Ecotourism, paddling boats, wind surfing.

Tourism is improving but the high airfare is an obstacle.

- 4. Climate change vulnerability should be built into all legislation and decision making.**

Agreed.

This will be addressed through the development of the National Climate Change Policy (NCCP) and the Joint Climate Change Adaptation and Disaster Risk Management National Action Plan (JNAP).

- 5. Given the multiple use of nature and importance of the marine environment and resources to Tuvalu communities, there is a need for effective coordination of the activities by different departments and agencies responsible for the development and management of marine resources.**

Agreed. Coordination: *Te Kakeega II Strategic Area 7*. Natural Resources: Agriculture, Fisheries, Tourism, and Environmental Management. Civil Societies, Private Sector, MDGs, National Ocean Policy.

Need a coordination body for donor activities.

6. Encourage stakeholder participation and local communities in decision making, development and management of marine resources.

Agreed: use local committees, women, youth, churches, Falekaupule.

## NATIONAL LAWS

1. A number of national laws are out of date. As such, there is a need to review and update them so that they are relevant with prevailing circumstances and more importantly consistent with the requirements of regional and international agreements, conventions and instruments.

Agreed – there is a need for a review of national laws.

The greatest need is for linking the Falekaupule and Conservation Area Acts which may be achieved through the upcoming national climate change policy. In addition, the National Strategy for Sustainable Development 2005-2015 needs to be reviewed and updated.

## **INSTITUTE OF MARINE RESOURCES (IMR)**

IMR provides scientific and technical skills, and capacity-building, marine resource assessments, coral reef monitoring/ database maintenance and socio-economic analysis for fisheries and aquaculture. IMR aims to increase the regional capacity to sustainably develop its marine resources through applied research, training and teaching. Research and development projects focus on marine ecology, aquaculture and biodiversity issues.

Much of IMR's work is externally-funded research and consultancies on the region's marine environment and its resources. Current activities centre on coral reef monitoring, marine biodiversity assessment, aquaculture management and cetacean research. The Institute also coordinates the South-West Pacific node of the Global Coral Reef Monitoring Network ([www.GCRMN.org](http://www.GCRMN.org)).

## **CONTACT DETAILS**

Phone: 323 2930/ 323 2988

Fax: 323 1526

Website: [www.usp.ac.fj/imr](http://www.usp.ac.fj/imr)

Email: [joeli.veitayaki@usp.ac.fj](mailto:joeli.veitayaki@usp.ac.fj) OR [cherie.morris@usp.ac.fj](mailto:cherie.morris@usp.ac.fj)



School of Marine Studies

Institute of Marine Resources